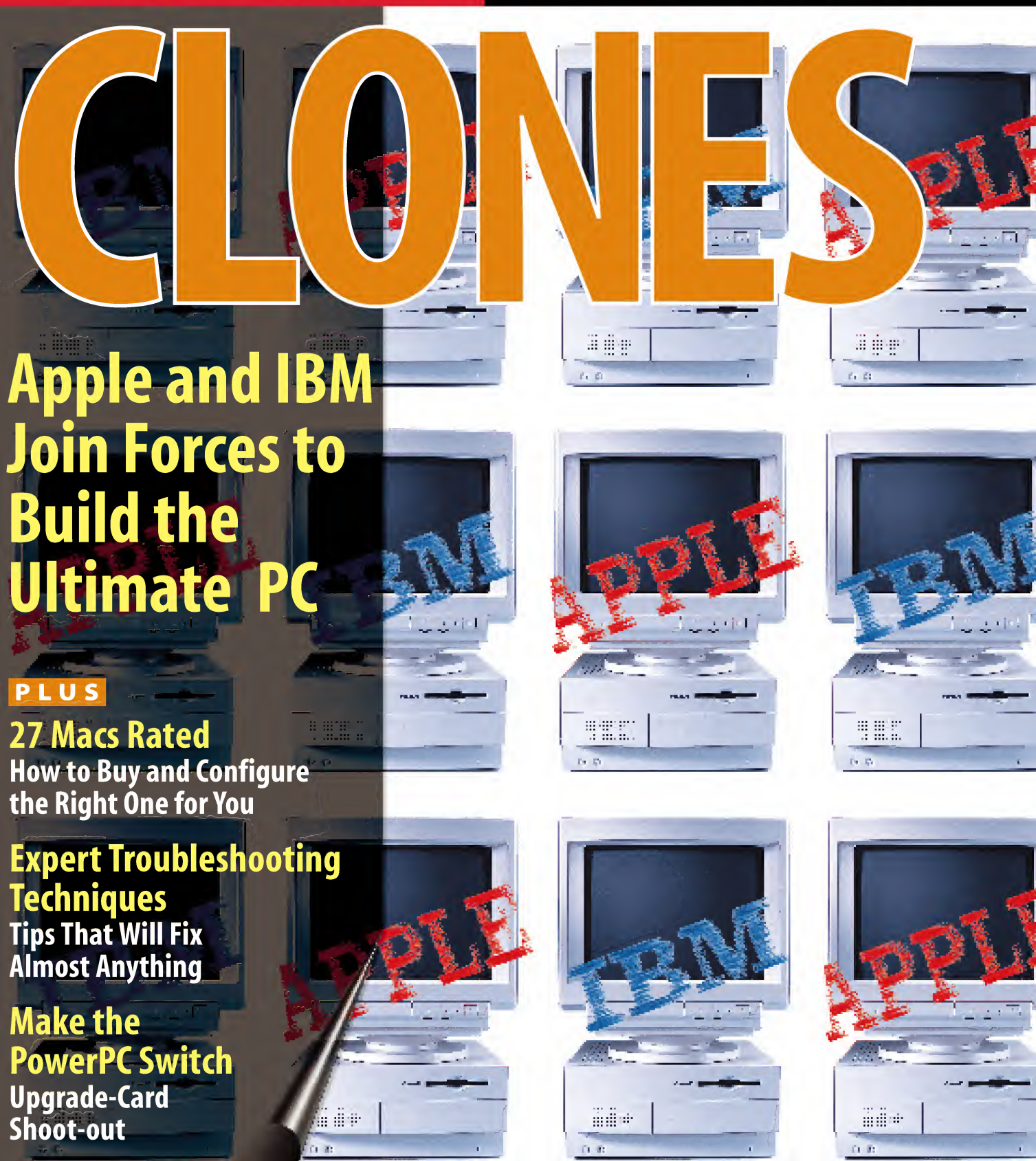
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CLONES

Apple and IBM Join Forces to Build the Ultimate PC



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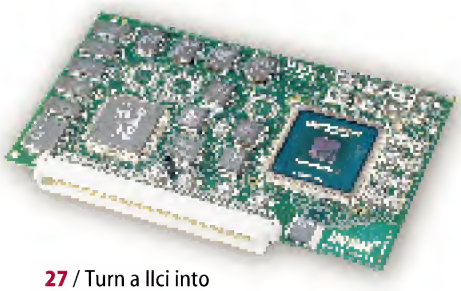
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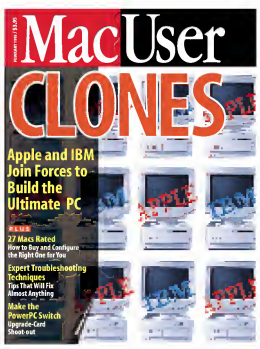
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Cover photo / Diane Dempsey

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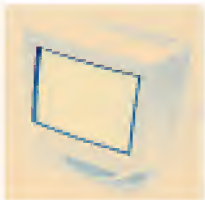
ONE PLATFORM, MULTIPLE OS CHOICES. That's the heart of the announcement presented at a historic November meeting of the PowerPC partners. But what does this mean for you? Better prices, for one; the future of the Macintosh, for another. BY HENRY NORR / **76**



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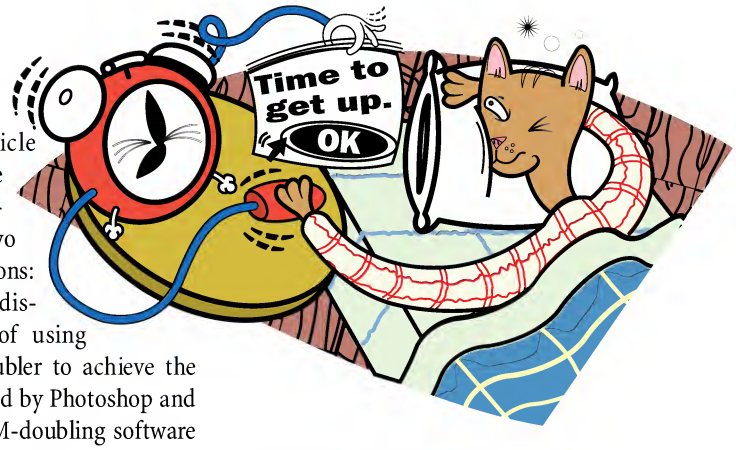
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LETTERS



Power Full

THE POWER MAC TEST ("Power Imaging for Power Publishers," November '94, page 72) was terrific. In-depth data comparing the Power Macs to machines such as Pentium-based PCs and the SGI Indy are very important. Keep up the good work.

Richard A. Hyman
via the Internet

AS MANAGER of an in-house advertising department that recently upgraded to Power Mac 8100s, I read "Power Imaging for Power Publishers" with great interest. Nonetheless, I was dismayed to see that your cross-platform comparison tests included various Mac configurations using third-party add-ons but none for the Pentium PC. By ignoring performance gains available via add-ons to both platforms, you missed an opportunity to honestly and fairly compare both machines.

Kent Lufkin
via the Internet

/ We set out to examine several options available for people using Adobe Photoshop on the Mac, from adding RAM to using DSP accelerators to looking at other platforms. If you decided to switch to a Pentium-based system after reading the story, you could then look at ways to make *that* machine run Photoshop faster — although when it comes to Photoshop-specific accelerators, the selection is limited. / PP

Write to Letters

c/o *MacUser*
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ILLUSTRATION / MORTENSBAK NYC

BRUCE FRASER'S article on Photoshop and the Power Macs was helpful, but I missed two real-world considerations:

The author didn't discuss the possibility of using Connectix's RAM Doubler to achieve the huge RAM sizes needed by Photoshop and its plug-ins. Does RAM-doubling software work in the uses he discussed?

He also didn't directly point out that the Dell PC might be the best-value machine for someone on a tight budget. It costs about half what the other machines do when they are all decked out. Was this a problem of political correctness — not being able to recommend, even with qualifications, a PC?

Art Dechene
Arthur_C._Dechene@capmac.org

/ RAM Doubler is fine as a means of keeping other applications open when you're working in Photoshop, but you shouldn't use it to allocate more RAM to Photoshop than you actually have. If you do, speed will suffer seriously, because you'll confuse Photoshop's own virtual-memory scheme.

As for the pricing, what we have here is a case of Apple and oranges. The prices cited were for systems as sold by the manufacturer. Apple doesn't sell the Quadra 950 or the Power Mac 8100 with our test monitor (we listed its price separately) or with 72 MB of RAM. Because RAM prices fluctuate, we did not add on the cost of third-party RAM.

The Apple advantage is that the Mac is truly plug-and-play, allowing buyers to choose from a variety of equipment at a variety of prices while knowing that what they purchase will work with their system. As the story indicated, the Dell system clearly gets the nod for price. But although a Power Mac configuration may cost 20 percent more than the Dell system, our tests show that you'll get at least 30 percent more speed with the former. / BF & PP

D'lightful, D'lerious, Dvorak

IF I DIDN'T KNOW BETTER, I would think that Apple had kidnapped John C. Dvorak and replaced him with one of the new clones we're hearing so much about. I mean, the November '94 column ("Seven Big Myths," page 224) can't be by the real Dvorak, can it? It's positive, upbeat, and —

OPEN FOLDER

Does *PC* mean *personal computer* or *political correctness?* According to Karl Ulrich, of Charlotte, North Carolina, it's both: "I never thought I'd be hearing about political correctness from my Mac!" Karl writes. He reports that WordPerfect's grammar checker suggests *woman* in place of *girl* but passed over *boy* without suggesting *man* — a clear double standard to Karl, who also points out that WordPerfect's spelling checker has a vocabulary of four-letter words guaranteed to make a schoolwoman blush. "It's a great late-night party game for nerds," Karl says. Nerds? You mean the *socially challenged.*

A bleary-eyed Denis de Castro, of Auckland, New Zealand, describes a vision of his alarm clock as a modal dialog box — "Sorry, but it's time to get up, OK?" — with no cancel button. Thanks for the report, Denis, but how about a *real* interface improvement for life: an Undo command, maybe?

One of our readers wishes he could undo a major error: Jeff Melrose, of Iowa City, Iowa, threw out years' worth of past *MacUser* issues only to discover a few weeks later that he needed to use them for reference. "I could kick myself for not saving those issues now!" he writes. Meanwhile, Michael Kirby, of New York City, writes that he is looking for a good home for his collection of every *MacUser* since October 1985, because he's moving to the Philippines. More profit-minded is Richard Morse, of Ventura, California: "I have the premier issues of *MacUser, Macworld, The MACazine,* and *St. Mac.* Are these precious gems worth any money to anyone, or should I toss them?" Let Jeff's plight be a lesson to you both.

After all, you never know when something from the past will become important again. Just ask Kenneth Macdonald, who wrote to us via the Internet with a question that chilled us to the bone: "I've forgotten my SAM [Symantec AntiVirus] password; what can I do?" Hmm . . . the answer must be in a back issue somewhere.

ASK DR. POWER MAC

IN ALL THE HOOPLA about the Power Macs and the speedy native software that's available for them, I haven't seen mention of whether the new software works on non-PowerPC Macs. For example, if I get a Power Mac and buy software for it, will the same software run on my old PowerBook?

Richard Hutson
via ZiffNet/Mac

/ Software designed specifically for Power Macs cannot run on 680x0 Macs. However, most software vendors offer a smart installer that lets you choose to run either a 680x0-only version or a PowerPC-only version, or they provide what is known as a Fat Binary, which runs on either chip. In the future, however, software vendors may implement features that require a PowerPC chip, because it is so much faster than the 680x0.

I'M RUNNING A RADIUS 21-inch gray-scale monitor on a Centris 610 with 1 MB ofVRAM. I want to put in a logic-board upgrade to a Power Mac 6100 but have been advised that the Power Mac architecture will not support my monitor. I need a large monitor and don't feel like shelling out another $800 or so for a new one. Will a Power Mac 6100 support my monitor?

Mike Duggan
San Francisco, CA

/ If you own a Radius Two Page Display 21GS, you can get a Power Macintosh 6100/60AV Logic Board Upgrade and use the AV video card to drive your monitor. Unfortunately, an older Radius gray-scale monitor (which I suspect you have) won't work with either the 6100's built-in DRAM video or with the AV card. Your best option in this case is to get the Power Macintosh 6100/60 Logic Board Upgrade and buy a Radius Precision Color 8XJ card, which retails for $599, although it should be cheaper on the street.

WHAT'S THE NORMAL frame rate for video recording on a Power Mac 7100/66AV? I've read 30 frames per second (fps) at 640 x 480 pixels, and Apple says 25 fps at 160 x 120 pixels, but I'm lucky to get 10 fps at 160 x 120 pixels, recording directly to RAM. I'm using Fusion Recorder with an allocation size of 12 MB, and I'm using the video compressor set to normal. Is my experience usual, or did I get the bad Apple of the bunch?

Byron Miller
Hickory, NC

/ The Apple figure you quote is actually Apple's estimated *playback* speed for QuickTime 2.0. Your recording figures seem about right — with a postage-stamp-sized window, our Power Mac 7100 also recorded at 10 fps.

dare I say it? — optimistic about the Mac and Apple's future.

If this "new" Dvorak is indeed Apple's first experiment with a clone, I think *MacUser* should keep him. He's better than the original and will certainly appeal to more of the marketplace.

Marc LaFountain
lafountain-marc@scarolina.edu

I HAVE A CURE for all the readers of your magazine who can't read John C. Dvorak without going mad. Each time I'm furious about what Mr. Dvorak is writing about my beloved Mac, I put the magazine down and go for a walk. The walk invariably takes me to the magazine vendor down the street. I read his column in the latest issue of *PC/Computing*, and as soon as I start reading it, I become happy again. He is even more zealous in his criticisms of the PC side of the world than he is of the Mac.

Martin Chaput
via the Internet

I REALLY LIKE John C. Dvorak's column. His fresh views on a subject and his ability to size up an issue are superb. He's not afraid to express an opinion that runs counter to popular trends. And often he's right!

Scott Mesch
via ZiffNet/Mac

Radius Redux

I JUST FINISHED reading "Choosing the Right Monitor" (November '94, page 94) and found the article to be very informative. However, I was quite surprised at the results of the MacUser Poll at the end of the article. Specifically, it was difficult for me to comprehend all the poor marks tallied for Radius. I manage a desktop-publishing-training facility in which we heavily use 16 Radius 20-inch color monitors for demanding graphic-arts work. We have nothing but praise for the quality of these monitors and especially the excellent Radius service and support we have experienced.

Mike Blum
via the Internet

Ihnatko's Instant Karma

I FIND MYSELF TAKING exception to Andy Ihnatko's "Karmic Strip" (November '94, page 23). The piece was extremely

unfair, offensive, and degrading.

He goes so far as to call PC/Windows users stupid. The people he mentions are at a PC convention to talk about and gawk at PC technology; they are not prepared to discuss Mac trends and are probably not very interested in that subject. I imagine that I would obtain similar results if I went to a Mac trade show and walked up to attendees and asked them if they thought EISA's clock-doubled, half-duplex architecture was an acceptable substitute for a true preemptive, full-duplex expansion bus such as MicroChannel or PCI.

The article would have been much funnier had it been less derogatory.

Trevor Schroeder
tschroed@wscunx1.wsc

IHNATKO'S ARTICLES bring to mind listening to a neighbor discourse on the topics of the day at a picnic — very casual and down to earth. He recognizes the everyday Joe Macintosh user as one not so greatly impressed with (or even well versed in) the technical jargon and internal workings of the Mac.

I have always enjoyed *MacUser* because I'm just what the name says — a Mac user. Not a programmer, not a systems analyst — a regular guy. A beer-drinkin', politically incorrect, cartoon-watchin', not-quite-finished-college, still-livin'-with-the-folks, eatin'-CheezWiz, usin'-my-Mac kinda guy. *MacUser* entertains me as well as informs me. Your magazine is user-friendly. I enjoy that.

Jason D. Signore
Zjman@aol.com

Download Free or Die

WHAT'S THE DEAL with the ZMac Utility of the Month? In the November '94 issue (New on the Menu, page 30), you state that "The Cheaper Image is available, for only the cost of download time" What's up with that? Weren't free downloads of the wonderful ZMac exclusives one of the selling points for ZiffNet/Mac? I hope this was a misprint.

John Thoo
jbthoo@ucdavis.ucdavis.edu

/ It depends on which on-line service you use. There is no connect-time charge if you access ZiffNet/Mac via CompuServe. On eWorld and AppleLink, connect-time charges apply. / JS

Windows Emulation

WE ALL KNOW the excitement of getting some fancy new program we've heard and read so much about. So imagine my thrill when I installed Microsoft Word 6.0 on my Mac. First, I found that I had to delete Word 5.1 to free up enough disk space to install it, but hey, the more space an application takes, the more things it can do.

So I double-clicked on the icon, and after a few moments, it was there — Windows running on my Mac. And I didn't even have to buy a Power Mac!

Rob Verkooyen
via the Internet

I OPENED THE BOXES for Word 6.0 and Excel 5.0 with great anticipation. But upon loading Word on a Quadra 800 and Excel on a IIci, I began my journey into Microsoft *hell*.

Printing a 35-page document in 2 hours and 48 minutes was beyond infuriating. It cost my company thousands of dollars in a week to deal with the slow processing, slow printing, and continual calls to technical-support representatives who kept espousing the virtues of Windows. We finally returned the products and reloaded the older versions.

Bottom line, Microsoft: If we wanted PCs, we'd have them. We want Mac products for our Macs, not bastardized versions of Windows that barely run on a Mac. Shame on you, Bill Gates!

Yvonne Walker
San Mateo, CA

An eWorld Ticket

FRANKLY, MICHAEL SWAINE, although eWorld may not have the complete feature set just yet ("An eWorld Ride," October '94, page 25), that's coming, and I'm glad there is another — competitive — game in town. Maybe now CompuServe will indeed *serve* our needs; clean up that obsolete, cumbersome, stumblebum interface; and respond to competitive pressure with a new and more realistic price structure.

I subscribe to both services and find I get virtually everything I need on eWorld, including an e-mail gateway to all my CompuServe addresses. What more could I ask for?

William J. Martin
70372.2136@compuserve.com

Address Unknown

I'VE NOTICED THAT when people write to you via electronic mail, you print their e-mail address. This seems a little strange to me. Can you imagine a magazine posting someone's home address below every letter they send?

This isn't customary, because the writers would either get letters from people who probably shouldn't be sending them letters or because they'd receive just too many letters as a result. You might reconsider printing the writers' e-mail addresses in the interest of privacy.

Matt Johnson
zagyg@netcom.com

/ We try to recognize the privacy of our letter writers — we print an e-mail address only if the writer has explicitly said that we can publish it. / JS

It's a Bird, It's a Plane . . .

I GOT MARRIED a couple of weeks ago and took my PowerBook 165 along [on the honeymoon] to keep up with e-mail. On the last day of the trip, I drove over my PowerBook with my father-in-law's Mercedes. My wife had put it by the front tire, and I unknowingly backed up the car over it.

I jumped out of the car to assess the damage and gulped as I pulled the torn carrying case off the PowerBook. I opened it and hit the power button, and it booted right up, smiling Mac and all. There wasn't even a crack in the case!

Maybe next week I'll drop it off the top of my office building. . . .

Sky Dayton
sky@earthlink.net

/ Perhaps your wife was trying to tell you something about the wisdom of bringing the PowerBook along on your honeymoon? / JS

CORRECTIONS

The design-and-construction rating for the La Cie Joule 1080 ("Big Gigs," October '94, page 92) should have been Acceptable; its mouse rating is adjusted upward to 3.5 mice.

The correct price per package for StarNine's Mail*Link SMTP 3.0 for QuickMail and Mail*Link SMTP for Microsoft Mail ("File Enclosures Cross Boundaries," September '94, page 133) is $595 for ten users. Current users can pay $195 for a limited upgrade or $495 for a site license.

The actual price for Tree Professional (October '94, page 63) is $695.

MAGGIE CANON



Byte, Book, and Candle

"HOT OFF THE PRESS!" I WONDER sometimes whether that phrase will eventually become nothing more than a quaint figure of speech, as printing presses, ink, and paper give way to bustling data lines, electronic files, and digital documents. Here at *MacUser,* we're heading further and further into cyberspace: We've been on-line since May 22, 1990, with ZiffNet/Mac, and we've been on Apple's eWorld since day one. This month we're debuting a new Internet column (Net Traveler), and we've got our own page on the World Wide Web (check it out at http://www.ziff.com/~macuser). Soon we'll be venturing into electronic media in the form of CD-ROM publishing.

It's fashionable to debate the changes that new media are bringing to the publishing industry and the reader experience. For now at least, the cheap, lightweight portability of paper remains a solid argument for books, newspapers, and magazines. As publishing people are fond of saying, "There's no better compression algorithm than the printed page."

But questions about the survival of print *miss the point.* It's not about one medium rendering another obsolete. There's a place in the world for energy-efficient fluorescent lighting *and* beeswax candles, a market for VCRs and Bette Davis videos on rainy nights *and* one for movie theaters that show aerial shots of Meryl Streep shooting Class 5 rapids on an 18-foot screen.

We've barely begun to tap the potential of electronic publishing and interactive media: Our energy would be better spent considering the very best use of electronic media as it exists today than debating whether electronic information will supplant print. We must ask ourselves what an interactive title can do, *because* of its medium, that's different from print.

There are many answers to that question: It would be prohibitively expensive to attempt to cram the huge amount of sound, text, and art you can pack onto a CD-ROM into a print medium. Sound adds an extra dimension, and the colors in backlit digital images can bring to mind the vibrance of stained glass. The participatory experience of interactive titles, especially educational ones, is shaping a generation of children. The searching efficiency and branched information of on-line reference materials is phenomenal. Indeed, CD-ROM encyclopedias are already outselling their traditional counterparts, encouraging the publishers of such references as *The Oxford English Dictionary* and *The Columbia Encyclopedia* to head toward publishing *only* on CD-ROM in future editions.

The promise of new media is not about competing with print. It's about firing up our imaginations.

We should also focus our energy on demanding excellence in electronic content. Not bits and bytes of best-sellers, slammed together into digital blue-plate specials, but careful attention to detail and aesthetic — the kind Gutenberg employed when he placed a sheet of paper onto the first printing press and pressed the hot inked type onto the pages, making the very best product he could with his technology.

Convenience demands excellence in the hardware "wrapper" for electronic content. Much money and energy is being invested in the pursuit of the perfect flat-panel screen for use as a slim, light substitute for our Sunday paper, among other things. A prototype from Xerox PARC features 300-dpi resolution, about four times that offered by computer screens. The idea of a featherweight electronic tablet that could deliver customized news to me on a sharp, colorful screen is exciting. I could learn to prefer this to the crisp, inky pages of my morning paper.

As for today's literary offerings — well, I have my doubts about whether I'll be reading the next Tom Wolfe novel on-screen. I will treat my monitor-weary eyes to some plain paper, thanks. Sometimes, though, a print novel truly gains value in its translation to electronic format, with the addition of images and sounds. But does this rob you of the pictures and sounds you would create in your own imagination? Who should determine the images that resonate in your mind after you read one of Ray Bradbury's novels?

The promise of new media is not about competing with print. It's about firing up our imaginations to find the best uses of great tools and content. And it's about cultivating an aesthetic for electronic information that can be cherished in the way people value their bedside novels, their mothers' old cookbooks, and their No. 2 Ticonderoga pencils.

It's going to be a long time before we see a flat-panel display tucked under every arm. Today, you can buy a newspaper or an old copy of *Atlas Shrugged* for a quarter, and you've bought a passport to another world. And last time I checked, everything in that newspaper and on that 25-cent book rack ran on the same operating system, same hardware, same instructions: Open mind, open cover, turn pages.

ANDY IHNATKO



Upping Yours

FOLKS, I'VE DECIDED TO FINALLY come clean and reveal the Dark, Brooding Secret I've desperately tried to conceal from you lo these many years. Honesty, after all, is the keystone of any successful columnist/reader relationship and, besides, this thing has been eating me up inside. Seven years ago, I killed a guy in a knife fight during what was, I now realize, a silly argument concerning which Dead End Kid John Sculley most closely resembled. All I can do is humbly admit that I have Sinned, promise to do better next time, ask for your understanding, and mention in passing that the gentleman I sliced open was a cad of the worst order anyway.

Well, of course, none of that's true, but now when you read that the most powerful Mac I — an industry columnist beloved by dozens of loyal readers as well as his mother — actually own is a puny LC III, you're likely to react more gracefully than you otherwise might. Like most of us in the computer dodge, I've learned that it's far easier to get Apple or one of your employers to lend you something fast and tawdry than it is to actually go out and buy one of the things. I'm not the only one in this predicament. Take the longtime president of one of the Mac industry's most successful companies: After many years at the top, he decided to chuck it all and experience life on that great open highway called Earth. There didn't seem to be a downside until he realized that literally overnight he'd gone from having a houseful of the ginchiest PowerBooks and desktop Macs on the planet to nothing more than a beach umbrella with the Apple logo on it. And what, I ask, is the final score when you have gained six months on the beaches of Australia but have lost a totally cherried-out 540c?

I'm telling you about all this for a Darn Good Reason. When you e-mail me with your highly appreciated questions and concerns about how much longer you can limp along with your Quadra 840AV and whether you should accept your parents' offer to buy you a new Power Mac 8100 for your next year of high school, please be understanding. If my response is prefaced by an essay on what I had to do to get access to an Apple II (without the language card, I might add) when I was your age, it's nothing personal and you should not feel the need to start a clothing drive on my behalf. I'm just being grumpy.

PROBLEM:

Your poor old Mac can't keep up anymore.

SOLUTION:

Choose one of Andy's easy upgrade options.

For the record, I'm writing this on a loaned Power Mac 7100, but nonetheless, the question that seems to be furrowing the brows of lots of Mac users today is, "Whatever will become of my Mac?" There are a bunch of ways to respond to this problem.

First on the list is to do what you would if you were experiencing chest pains: doggedly deny that you need to do anything. [*Andy is using a metaphor. Andy is not licensed to practice medicine, at least not within the continental U.S. and most of Canada. — Ed.*] This is cheap and, on occasion, highly successful. Often, the simplest way to fix speed problems on older machines is to lower your expectations. Switch back to System 7.01, for starters, and see how performance absolutely soars when you don't sandbag it with a ton of system extensions. Switch to older versions of most of your applications or to less ambitious applications entirely. NisusWriter, for instance, is far more agile on older machines than WordPerfect Mac or Word 6.0 and is file-compatible. Really, put the magazine down right now and start trying out some of these ideas; they're the cat's pajamas.

After you've exhausted that reliable and practical first step, the next thing is to see what a simple little procedure will do for you OK, now that we've gotten rid of those people, let me say that the preceding advice is nuts. Yes, you can boost the performance of your Experienced Macintosh to tolerable levels, but do you really want to be stuck in 1990 for the rest of your life? Unless your needs are fairly utilitarian — you treat your Mac as a simple piece of office equipment — you're going to have to blow some dough on additional hardware.

By far the cheapest upgrade path available for certain models is an age-old technique known as *chipping*. The basic procedure is to yank out the Mac's oscillator, which defines the tempo at which the processor handles things, and solder in a faster one. It'll cost less than $20 in parts, and on some machines it'll actually boost performance by about 20 percent. All the same, I can't recommend it. Unless you were the kid on your block who could remove the wrenched ankle from the Operation game and never make the guy's nose light up, you're likely to seriously thrash your motherboard in the process, and replacement motherboards do not come cheap.

Accelerator cards don't come cheap, either, but they usually offer the lowest-cost solution with the least muss and fuss. Most

people know how they work by now: You plug a daughtercard into your Mac's expansion slot, and it takes over for your pathetic, simpering little excuse for a CPU. It's a slick solution. As opposed to an official Apple upgrade or a whole new Mac, an accelerator can give you just a little or a lot of added power, depending on what you think you need and can afford, anywhere from spending a hundred bucks for a faster version of your existing CPU to having an utterly crankable Power Mac, or anywhere in between. Also, folks with upgrades on their mind sometimes overlook the fact that the $2,000 worth of memory they've stuffed into their old machines might be incompatible with brand-new Macs; an accelerator card saves you from having to make that nasty investment all over again (although to be fair, there are one or two products that can adapt old-style SIMMs for use on Thoroughly Modern Macs).

There are only two serious drawbacks to popping in an accelerator. First, an accelerator is one of those accessories where you really have to ignore prices and make your purchase based on the strength of the company producing it. Every time there's a significant new release of system software, it seems like there's a technical note right behind it announcing that Macs with certain accelerator cards go nuts when the software is installed. Most of the major producers work to make sure these problems don't occur. If you bought a card from two guys who were in the pants business last year, your Mac could become a permanent doorstop awfully fast.

Second, it's just as much of a nuisance to witness pals of yours cruising by with SCSI-2 interfaces, EtherTalk, better onboard video, and stereo sound while you're tooling along in a Gran Fury. It's got a killer new engine and runs just as fast, sure, but the fact remains that it has none of the way-cool new hardware features of the latest models. Also, when you start looking at boards from reputable outfits that offer truly killer speed, you'll quickly notice you're only a 9-iron away from the cost of a whole new Mac as it is. Which is why I apply this general rule of thumb: If the last time you bought a completely new Mac was back when there was a Republican — no offense — in the White House, it's time to start shopping.

Up until now, most improvements in Mac hardware have been incremental; this one is a little bit faster, this other one has a better drive controller, and so on. With the exception of the sad little IIvx, there hasn't been a compelling reason to beat your head against the wall two months after making a major purchase.

Power Macs, however, changed all that. At some point in your life, you will be using a Power Mac. This is your destiny, my child, and I've always found that the thing about destinies is you're better off getting started on 'em as soon as possible. If you're using the same hardware you've had since 1989, suffice it to say that you won't know what you're missing until the first time you fire up your new Mac, pick up a book to read during the startup process, and then realize that the Finder is waiting for you even as you're trying to remember whether or not you've read this *Dilbert* before.

Now *that's* progress.

POWER MAC UPGRADES /

PowerPC Card Resurrects Mac IIci

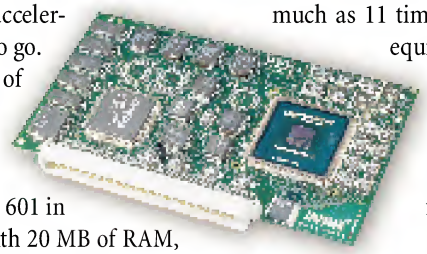
DayStar's Turbo 601 transplant for IIci offers Power Mac 6100 speeds.

DON'T TOSS YOUR MAC IIci into the dustbin of technology. Turn your Mac IIci into a PowerPC screamer with the DayStar Turbo 601 upgrade, a PDS accelerator with a PowerPC 601 chip onboard. A IIci loaded with a Turbo 601 charged through MacUser Labs' test suite and came close to equaling the speed of a Power Macintosh 6100/60. DayStar Digital is also introducing a 100-MHz version of the PowerPro 601 accelerator for the Macintosh Centris and Quadra lines.

The Turbo 601 uses a 66-MHz PowerPC chip that has the same speed as that of the Power Mac 7100/66. The card, which also includes a 256K cache to help keep the processor humming, sports a list price of $1,199 — a bargain, considering the speed the card provides and the price of used IIci's these days.

Although the current version works only in the PDS of the IIci, DayStar has stated that the Turbo 601 will start supporting the IIsi, IIvi, IIvx, and Performa 600 in the first half of 1995. Faster versions of the Turbo 601 will become available from DayStar as upgrades for current customers.

Installation of the Turbo 601 card shows off the Mac's plug-and-play simplicity. You plug the card in to the PDS and install the included control panel and extension, and your Power PC-accelerated IIci is ready to go.



To get an idea of the speed gains that were possible, we tested the DayStar Turbo 601 in a IIci equipped with 20 MB of RAM, a 160-MB hard drive, and an Apple 8•24 Display Card. System 7.5 — required for using the Turbo 601 — was installed on the hard disk.

So how did the Turbo 601 perform? The Turbo 601-equipped IIci kept pace with the Power Mac 6100 on processor-intensive tests, such as running a filter operation in Adobe Photoshop 2.5.1 and applying lighting in Fractal Design's Painter 2.0. When redrawing a complex graphic in FreeHand 4.0, the Turbo 601-equipped IIci was approximately 20 percent slower than the Power Mac, and in the ClarisWorks 3.0 test, it was only half as fast as the Power Mac. Compared to an unaccelerated IIci, however, the Turbo 601-equipped IIci was as much as 11 times as fast. The Turbo 601-equipped IIci's slower speeds stem primarily from limitations in the IIci's architecture that affect the card's retrieval of data from the IIci's memory.

We did not have a chance to test DayStar's newest accelerators, the 75 MHz PowerPro 601 and the 100 MHz PowerPro 601, both for the Quadra and Centris lines, but they show promise. Similar to Apple's original Power Macintosh Upgrade Card, the cards install in the PDS and have a built-in 1-MB cache.

Available by the time you read this, DayStar's PowerPro 601 is $1,499 and $2,199 for the 75- and 100-MHz versions, respectively. 404-967-2077. / Sean J. Safreed

PowerPC Upgrade Turbocharges the IIci

Application-based tests

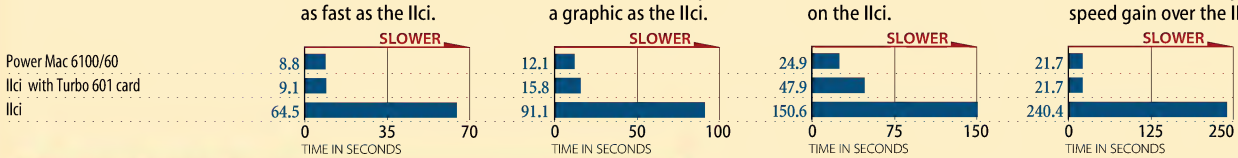
MacUser ZD LABS BETA!

Adobe Photoshop 2.5.1
The IIci with the DayStar Turbo 601 applied an Unsharp Mask filter seven times as fast as the IIci.

Aldus FreeHand 4.0
The IIci with the DayStar Turbo 601 was nearly six times as fast at redrawing a graphic as the IIci.

ClarisWorks 3.0
Finding and replacing text was three times as fast on the IIci with the Turbo 601 as it was on the IIci.

Fractal Design Painter 2.0
Using the Apply Lighting filter, the IIci with the Turbo 601 achieved an amazing 11x speed gain over the IIci.



MacBench 2.0 Indexes

	PROCESSOR (0–40)	FLOATING POINT (0–120)	DISK (0–15)	VIDEO (0–20)
IIci with Turbo 601 card	29	94	5	8
Power Mac 6100/60AV	27	97	7	13
Quadra 630	10	10	10	10
IIci	2	4	4	4

The revised MacBench, version 2.0, reports normalized scores (longer bars are better), using the Quadra 630 as a baseline machine; this machine is assigned a score of 10. MacBench 2.0 tests the various subsystems of a Macintosh, including the processor, floating-point unit, disk, and video. Notable among these numbers is the processor score. The IIci with the DayStar Turbo 601 demonstrated triple the processor speed of a Quadra 630, a machine equipped with a 33-MHz 68040.

VIDEO CARDS /

Expand Your Monitor

Get bigger screens from small cards.

FEELING CRAMPED by limited screen real estate? Desktop publishers and others who want to see more pixels and multiple pages on their monitors will want to check out Radius' new line of high-resolution Thunder cards and EA Research's EAsycolor 24/1360 card. These cards support standard 21-inch monitors at a resolution of 1,152 x 870 pixels and top out at 1,600 x 1,200 pixels. Better yet, they fit into any NuBus-equipped Mac or Power Mac, thanks to their 7-inch form factor.

Radius Thunder IV Series. The line of Thunder cards starts with the low-end Thunder/24 GT and peaks with the Thunder IV GX•1600. All four cards offer QuickDraw acceleration and 1,600-x-1,200-pixel resolution at 8-bit color. The entire line also offers Dynamic Desktop software, for switching resolutions and bit depth on the fly. Radius includes ColorComposer software, which produces better screen-to-print fidelity through proprietary color-matching technology. Finally, all the cards use a 10-bit digital-to-analog converter that provides more-accurate on-screen color.

What differentiates the cards from each other is the resolutions they support at 24-bit color and whether or not they come with Radius' four-DSP PhotoEngine daughtercard. The Thunder/24 GT ($1,999) supports only 1,152 x 870 pixels at 24 bits, and the PhotoEngine is optional. The Thunder IV GX•1152 ($2,599), Thunder IV GX•1360 ($3,299), and Thunder IV GX•1600 ($3,999) include the PhotoEngine and support 24-bit-color displays at 1,152 x 870, 1,360 x 1,040, and 1,600 x 1,200 pixels, respectively. 408-541-6100.

EA Research EAsycolor Card. The EAsycolor 24/1360 card ($1,999) duplicates the functions of the Radius cards but at a lower price. It supports displays with resolutions as high as 1,360 x 1,040 pixels at 24-bit color and includes QuickDraw acceleration. It uses an LSI RISC chip to accelerate Photoshop filters and supports resolution switching on the fly. It too has a special chip for RGB-to-CMYK conversion for users working in CMYK mode in Photoshop. 510-867-0967. / Sean J. Safreed



CD-ROM /

Smell the Disc

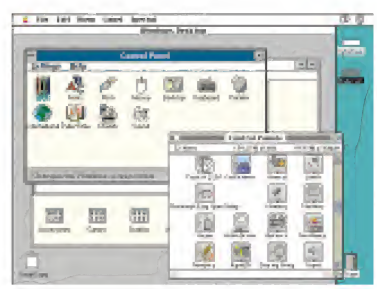
TREADING THE FINE LINE between stupid and clever was what the legendary heavy-metal band Spinal Tap did best — a fact on display in Voyager's new CD-ROM based on the classic 1984 mockumentary *This Is Spinal Tap.* The two-disc set ($35) features the entire movie in QuickTime (including two alternative soundtracks featuring running commentaries by the production crew and the actors) plus more than 90 minutes of never-before-seen footage cut from the original. On a scale of 1 to 10, these discs go to 11. 212-431-5199. / Jason Snell

OPERATING SYSTEMS /

Run Windows on 68040 Macs

QUADRA, PERFORMA, AND LC owners who are envious of the Power Mac's ability to run Windows now have a SoftWindows of their own — SoftWindows for Macintosh, from Insignia Solutions. According to Insignia, the new program is 30 percent faster than Insignia's older 68000 SoftPC products, which ran most DOS and Windows applications at speeds similar to those of a 25-MHz 386-based PC.

MS-DOS 6.21 and a version of Windows 3.1 that has been optimized for 68040-based Macs come with the SoftWindows for Macintosh package. SoftWindows' speed gains are a result of rewritten video drivers that make direct calls to the Mac's QuickDraw rather than emulating a PC's video circuitry. In addition, this version uses the built-in floating-point unit in the 68040 to perform Intel 287 FPU functions.



SoftWindows for Macintosh includes Novell NetWare client software for both Ethernet and token ring. In addition, users can install other PC networking software, including Windows for Workgroups, on top of SoftWindows.

Like the Power Mac version, SoftWindows for Macintosh doesn't support Windows' 386 Enhanced mode, so it's incompatible with some Windows applications. Insignia plans to add Enhanced-mode support to SoftWindows for Power Macintosh in the first quarter of 1995 but has not announced when the 68040 version will include Enhanced-mode support.

SoftWindows for Macintosh retails for $499. The upgrade price is $79 for owners of SoftPC with Windows, $99 for owners of SoftPC Professional, $129 for owners of SoftPC 3.0, and $149 for owners of older SoftPC versions. 415-694-7600. / John Rizzo

MACUSER/ZMAC UTILITY OF THE MONTH

Big Mac Pack Attack

THEY'RE BACK. They're lean and mean, and they're going native. This month ZMac presents a package of three updated utilities by programmer extraordinaire Mike Throckmorton. All have been rewritten for complete System 7.5 compatibility and enhanced performance. The Throckmorton Power Pack has new versions of BackSplash, a desktop picture utility; Back2TheFolder, which lets you return instantly to recent files and folders from within Open and Save dialog boxes; and HideAlways, an extension that does away with window clutter when you switch applications. All three have native Power Mac code for maximum speed.

The Throckmorton Power Pack is available exclusively from the ZiffNet/Mac service on CompuServe (GO ZMC:MACUSER), ZiffNet Selections on AppleLink, and ZiffNet/Mac services on eWorld (Shortcut: MacUser). / Mark Simmons

Low-End Macs Get Speed Boost

Apple and DayStar cards clock 3x speeds on LC, Performa, Quadra.

LOW-END MACS don't have to mean low-end performance, thanks to the long awaited PowerPC upgrades from Apple and DayStar Digital for LCs, Performas, and Quadras. The Apple Macintosh Upgrade Card and the DayStar PowerCard 601 offer 68040-based Macs the ability to run Power Mac-native applications at speeds three times as fast as those of their unaccelerated/non-native counterparts.



Each company sells the upgrade package under a different name, but the product is identical. That's not surprising, because Apple and DayStar jointly developed the PowerPC upgrade. Each upgrade ships with a full version of System 7.5, without which the card cannot be used, and ClarisWorks 3.0, a fully native application. Apple recommends that the Macintosh Upgrade Card be installed by an authorized dealer. DayStar, on the other hand, ships an illustrated manual for those interested in install the product themselves.

Unlike the Power Macintosh Upgrade Card, which fits into a Quadra's PDS, Apple's and DayStar's new cards fit directly into the 68040 socket. The 68040 is still available, because of a pass-through connector on the upgrade card that allows the machine to boot from either the 68040 or the PowerPC 601. The system can't use both processors simultaneously, however; to switch back to the 68040, you must turn off the PowerPC through a control panel and reboot. This flexibility lets you run applications on either processor for the maximum speed of 680x0 or Power Mac-native applications.

The card doubles the clock speed of the machine's motherboard. On the LC 550, 575, and 630; the Quadra 630; and the Performa 550, 560, 570, and 630, the card operates at 66 MHz. Only the LC 475 and 520, the Quadra 605, and the machines in the Performa 470 series operate at 50 MHz. This card doesn't support any other LCs or Performas, however. $659. Apple, 408-996-1010; DayStar Digital, 404-967-2077. / Sean J. Safreed

MacUser ZD LABS BETA

Power Mac Time Trials

The revised MacBench, version 2.0, reports normalized scores (longer bars are better), using the Quadra 630 as a baseline machine; this machine is assigned a score of 10. MacBench 2.0 tests the various subsystems of a Macintosh, including the processor, floating-point unit, disk, and video. Notable among these numbers is the processor score — the Apple Macintosh Upgrade Card tripled the processor score of the Quadra 630, and the Quadra 630 with the card installed even bested the Power Mac 6100/60.

MacBench 2.0 Indexes

	PROCESSOR (0–40)	FLOATING POINT (0–120)	DISK (0–15)	VIDEO (0–20)
Quadra 630 with Apple Macintosh Upgrade Card	29	68	9	10
Power Mac 6100/60	27	97	7	13
Quadra 630	10	10	10	10

NATIVE POWER MAC APPLICATIONS

THE FOLLOWING IS a list of recently shipped native Power Mac applications.

Business		
Word 6.0	Microsoft	206-882-8080
Games		
Glider Pro	Casady & Greene	408-484-9228
Multimedia		
StudioPro 1.5.1	Strata	801-628-5218
WalkThrough Pro 2.0	Virtus	919-467-9700
Networking/Communications		
FileWave	Wave Research	510-704-3900
Publishing/Graphics		
Live Picture 1.5.5	HSC Software	805-566-6200
PageTools 1.0	Extensis	800-796-9798
Painter 3.0	Fractal Design	408-688-5300
Utilities		
MacTools 4.0	Central Point Software	503-690-8090
RAM Doubler 1.5	Connectix	415-571-5100
StuffIt Deluxe 3.5	Aladdin Systems	408-761-6200

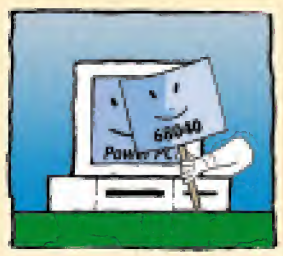
Banish Them Ol' Emulation Blues

STILL HAVE 680X0 APPLICATIONS running on your Power Mac? Give them a speed boost by replacing Apple's emulator with 68K Faster, from Itty Bitty Software. Later in 1995, the next generation of the Power Macs should arrive, with an enhanced emulator from Apple that improves 680x0-application speed.

68K Faster uses a faster but more complex method of executing 680x0 code on the PowerPC chip. The Apple emulator employs an interpreter that looks up 680x0 instructions in a table, finds the equivalent PowerPC instructions, and executes them. The Itty Bitty product takes a 680x0 instruction and recompiles it directly into PowerPC code, which can then be cached and reexecuted as needed.

Depending on the 680x0 code, 68K Faster can deliver speed gains as great as 200 percent over Apple's current emulator's speeds. However, the cost of extra speed is in RAM, which is necessary to cache the recompiled code. Since much of Mac system software (such as AppleTalk, SCSI Manager, and the like) runs in emulation, the result of using Itty Bitty's 68K Faster is a faster Power Mac, not just faster 680x0 applications.

Apple is also exploring dynamic recompilation — the technique that 68K Faster uses. Some parts of this technique may enhance the performance of 680x0 code in the next generation of Power Macs.



Itty Bitty planned to ship 68K Faster before year's end for less than $60. As its name suggests, Itty Bitty is a small company, so try contacting it via e-mail at 72457.2237@compuserve.com. / SJS

STORAGE SYSTEMS /

New Iomega Zips Along



UNLIMITED STORAGE for under two hundred bucks — that's the promise of Iomega's Zip Drive. A new flexible-disk technology crams as much as 100 MB onto a rugged 3.5-inch Zip Disk, with a drive speed comparable to that of a slow hard drive. Iomega expects 100-MB disks to be widely available for $19.95 apiece and 25-MB disks for $9.95 apiece; each size will be sold separately and in discount five-packs.

When Zip Drives hit the market in early 1995, at street prices expected to hover around $199, they'll include a 100-MB disk loaded with Zip Tools, Iomega's new file-management, organization, and backup software. With Zip Tools, Iomega's goal is to enable users to easily manage all their files and applications on multiple Zip Disks, either shared between home and office or all at one site.

Zip Drives will be sold in two configurations: one with a Centronics parallel port for PCs and the other with a SCSI port for Macs and PCs equipped with SCSI cards. By using disk-sharing software such as PC Exchange, Mac and PC users can swap Zip Disks. SCSI-equipped Zip Drives will be bundled with driver software for Macs and PCs, so a drive can be moved between a Mac and a PC running Windows. 800-777-6654 or 801-778-1000. / Rik Myslewski

TECHNOLOGY TRENDS /

Storage Vendors Gear Up for 1995

IT'S A GREAT YEAR for buying a hard drive. Thanks to some technologies that have been kicking around for years but are only now becoming practical, hard drives will be faster, cheaper, and more capacious than ever.

So what's new? IBM and Quantum are introducing mechanisms that take advantage of magnetoresistive (MR) head technology. The heads that employ this technology are more sensitive than normal thin-film heads, so they require less power to write data and the heads fly closer to the disks and write data in smaller-sized blocks. All this means data density goes up, throughput goes up, and costs go down.

Both of these companies' mechanisms will also be integrating PRML (partial response maximum likelihood), a new channel architecture that allows for greater efficiency in moving data within a drive.

Quantum, thanks to its acquisition of Digital Equipment's storage division, is shipping to manufacturers its Capella Series of 1- and 2-GB mechanisms, which use MR heads and PRML channels. Like all other MR mechanisms, Quantum's offer state-of-the-art performance at a lower spin rate, thus demonstrating increased reliability and reduced power requirements, noise, and heat.

IBM will also ship 2.5-inch PowerBook mechanisms that pack 350 MB of data onto a single platter or 720 MB onto two platters. But perhaps the most exciting ones coming from IBM are its two UltraStar mechanisms. Due by the end of 1995, both are 3.5-inch mechanisms, one with a capacity of 11 GB and the other with 8.7 GB. IBM claims that the 8.7-GB version will be similar in speed to Seagate's twin-head parallel Barracuda, at a much lower cost. And what about reliability? IBM is claiming that these new mechanisms have an MTBF of a million hours.

These mechanisms will be available in hard drives from many manufacturers. / Mark Frost

UTILITIES /

Lock Down That Hard Drive

THE MAC INTERFACE might be easy to use, but it's also easy to abuse, especially if your Mac is shared with others. To protect your hard disk from mischief or unauthorized access, check out these updated utilities that help keep your Mac secure.

DiskGuard 1.0. ASD Software's disk-security package works on all SCSI disks, including removable media, and can protect disks at startup, at PowerBook wake-up, or after a user-defined period of inactivity. Users can even be limited to access only during certain hours or days of the week. $60. 909-624-2594.

FolderBolt Pro 1.0.1. This new version of Kent Marsh's FolderBolt allows users to password-protect folders and make them read- or write-only. Among the enhancements in FolderBolt Pro are improved network-administration abilities and Power Mac-native encryption modules for ensuring file security. $129. 714-522-5625.

MacControl 1.8. This utility from BDW Software protects files and folders from alteration while allowing users to move them around in the Finder. It restores files to their original locations at restart. $59. 612-686-5462.

MacPrefect 2.4. Also Power Mac-native, Hi Resolution's folder-management utility MacPrefect now lets administrators choose what windows will open at startup, determine what Chooser devices are accessible, and limit how many copies of a document a user can print. As always, it restricts the moving and editing of files and folders. $61. 508-463-6956.

On Guard 1.1. This utility from Power On Software controls where users can open, save, or view files and folders and launch applications. Setting up individual accounts and passwords is optional. $57. 612-946-1272. / Jason Snell

CLIP-AND-SAVE

The Urge to Merge

CONFUSED BY MERGERMANIA? Here's your clip-and-save guide to where to find products from your favorite companies, now that someone else is selling them.

ALDUS + CoSA + compumation + MACE + Adobe = Adobe*

ALTSYS + MACROMEDIA = MACROMEDIA

A · V · I · D + digidesign = A · V · I · D

cache + CALERA = cache

Central Point Software + FIFTH GENERATION SYSTEMS + SYMANTEC = SYMANTEC

intuit + ChipSoft + Microsoft = Microsoft

SUPERMAC + VIDEOFUSION + radius = radius

WordPerfect + NOVELL = WordPerfect + NOVELL

*But: ALDUS FreeHand → Adobe FreeHand → ALTSYS FreeHand → MACROMEDIA FreeHand



CD-ROM CHANGER /

Load 7 Discs at Once

Nakamichi MusicBank system changes in a flash.

WELL RESPECTED BY AUDIO enthusiasts, Nakamichi is now entering the computer domain with a fast CD-ROM changer based on its MusicBank mechanism. The MBR-7 offers the convenience of keeping seven discs on your desktop simultaneously and has a bargain street price of $499 ($649 list).

The MusicBank mechanism uses robotics that can load as many as seven discs via a front-loading tray — no caddy is required. Seven buttons on the front panel correspond to seven slots inside. To load a CD-ROM into the drive, you press a numbered button, place the CD-ROM in the tray, and press the button again. All discs are automatically mounted on the desktop, and each disc's directory is cached in RAM. The system is easier to use than a multidisc caddy and offers a disc-to-disc access time of 2.5 seconds.

Bulkier than the average external hard drive, the MBR-7 contains a double-speed CD-ROM mechanism with a SCSI-2 interface. The drive reads all major CD formats, including audio CDs, CD-ROMs, and Photo CDs. It comes with an audio-CD-player application, much like Apple's CD Audio Player, although not as feature-laden — for instance, it lacks repeat and shuffle-play controls.

OCEAN Microsystems is the exclusive distributor. 714-898-1340. / Mark Frost

DOCUMENT EXCHANGE /

Common Ground 2.0 Stays True to Doc

NOT CONTENT TO PLAY second fiddle to Adobe Acrobat in the portable-document-tool category, No Hands Software's Common Ground 2.0 has new document fidelity and annotation features and an improved text-search engine.

Improved Fidelity. Previously restricted to a fixed set of output resolutions, Common Ground documents can now be printed with fidelity at any resolution, thanks to the TrueDoc font technology from venerable typography company Bitstream. By using a proprietary technology to record font characteristics, TrueDoc eliminates font embedding. No Hands says that TrueDoc data takes up a quarter of the space embedded fonts would consume.

Another aid in retaining fidelity is Common Ground's improved PostScript support. The program can convert raw PostScript files into Common Ground format and now uses a PostScript Chooser extension, meaning that vector graphics in documents remain resolution-independent.

Annotation Features. Common Ground 2.0 adds annotation features such as hypertext links, text notes, bookmarks, and colored highlighting of selected passages.

Search Capability. Users will be able to perform full-text searches using Boolean, Proximity, and other techniques courtesy of the Verity search engine in Common Ground 2.0. Common Ground now includes a 150K freely distributable Common Ground MiniViewer. $190. 800-598-3821 or 415-802-5800. / Jason Snell

DESKTOP VIDEO /

Budget AV Card Captures Quality

DESKTOP-VIDEO PRODUCERS usually have to choose between compromising on quality to save money or buying the best equipment and busting their budgets. The Radius Spigot AV Producer, however, delivers full-screen, full-motion, 24-bit-video output for Macs and AV Power Macs at a price that won't jeopardize your credit rating.

The Spigot AV Producer ($1,799) is in the midrange of the Radius line of video-production products. Although the company's lower-cost SpigotPower AV offers users of AV Macs full-motion video capture, it compromises on output quality by using the Macintosh AV-output circuitry.

To achieve 24-bit output at 640 x 480 pixels and 60 fields per second, the Spigot AV Producer uses its own video-output circuitry and features S-video and composite-video options. The resulting video quality is comparable to that of VHS, but it's not as crisp as the quality of the S-video output possible with the company's top-of-the-line VideoVision Studio. Unlike the VideoVision Studio, though, the Spigot AV Producer takes advantage of the AV Mac's built-in 16-bit-sound capability. The Spigot AV Producer is compatible with QuickTime 2.0. 408-541-6100. / Sean J. Safreed



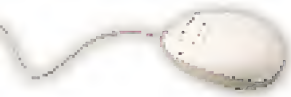
CD-ROM /

Tales of the Macabre

ARE THERE GHOSTS in your machine? You might think so when you load Media Design Interactive's CD-ROM Ghosts. The horror-movie veteran Christopher Lee plays Dr. Marcus Grimalkin, who leads you on a tour of the world's most haunted house, Hobbs Manor. Here you'll discover an apparition in every room, listen to eyewitness accounts, view spooky photographs, and gawk at authentic ghost-busting equipment. Leave the hall light on $49. Distributed by Psygnosis; 051-709-5755. / Kristin Balleisen

NEW & NOTABLE

HARDWARE /



▼ **Kensington Thinking Mouse.** An ergonomic design and an easy-to-grip rubberized surface highlight this new four-button mouse. Included is software for assigning various functions — key equivalents, clicks, double-clicks, and more — to the buttons. $100. 415-572-2700.

Fargo Pictura 310. Featuring the ability to act as either a dye-sublimation or thermal-wax printer, the Pictura 310 prints at 300 dpi on paper sizes as large as 12 x 20 inches, allowing the printing of full tabloid-sized bleeds. The printer connects to a Mac via an included NuBus card. Adobe PostScript Level 2 is a $699 option. $4,995. 612-941-9470.

DEClaser 3500. Rated at 12 pages per minute, this printer ($2,099) is designed for small and medium-sized workgroups. The DEClaser 3500 includes 3 MB of RAM (expandable to 19 MB) and Adobe PostScript Level 2. It prints at 600 dpi and can send and receive faxes directly via a PostScript fax option ($349). A networked version ($2,199) includes simultaneously active serial, parallel, and LocalTalk ports as well as support for TCP/IP, EtherTalk, and NetWare. 800-777-4343 or 508-493-5111.

Micropolis Capricorn and Taurus. Each of these two multigigabyte hard-disk drives has a fast, 7,200-rpm spin rate and transfers data through a SCSI-2 bus. The drives are available in versions optimized for digital-audio and -video applications. The Capricorn ($3,765; $3,895 with AV optimization) provides 4.29 GB of storage, whereas the capacity of the Taurus ($2,320; $2,410 with AV optimization) is 2.1 GB. 818-709-3300.

Conner Peripherals Disk•Stor. Intended for use with Power Mac 8100s, these self-cooled disk arrays use both SCSI ports and offer 2 or 4 gigabytes of disk space. A Wide SCSI-2 option, including a NuBus adapter, is available, as are external as well as internal configurations. Prices of the arrays range from $1,570 to $3,825. 408-456-4500.

SOFTWARE /

Virex 5.5. Native Power Mac support and the ability to scan compressed files are among the new features in this antivirus utility. Sporting a new interface, Virex now automatically scans for viruses in archives created by StuffIt Deluxe, Compact Pro, and other compression programs. Updates on new viruses downloaded from on-line services can be added to Virex's library through a simple drag-and-drop operation. $100; upgrade from Virex 5.5, $25. Datawatch. 919-549-0711.

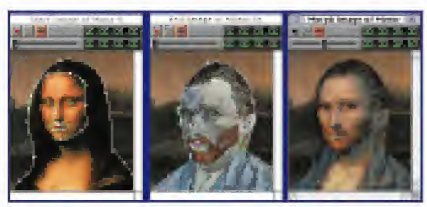
ScreenReady. Aimed at multimedia designers who produce works for screens instead of paper, ScreenReady is a Chooser extension that creates an anti-aliased PICT or TIFF image when a user issues a Print command. It supports screen sizes from 640 x 480 pixels to 1,280 x 1,024 pixels and processes EPS graphics based on their PICT previews, not their embedded PostScript information. $99. Adobe Systems. 206-622-5500.

ZipQuest Pro. For those who need the ZIP code, area code, local time, or county of Anytown, USA, this utility delivers. ZipQuest Pro provides contact information, including a city's state; the distance from your location; and in some cases, even the latitude and the longitude. You can access ZipQuest Pro information via Apple events, QuicKeys 3.0, or AppleScript. $50; biannual updates, $20 each. Montage Software Systems. 203-834-1144.

NoteScan. With a musical spin on OCR, Temporal Acuity Products' NoteScan allows users to scan in sheet music and convert it into a format readable by the company's Nightingale music-notation software. The scanned music can then be reorganized, edited, printed, or converted to a MIDI file. $95; bundle with Nightingale, $495. Acuity Products. 206-462-1007.

CalLANdar 2.30. This scheduling program is designed for use in a cross-platform environment. It includes messaging and office scheduling functions and supports a host of cross-platform e-mail products, including cc:Mail and Microsoft Mail. Price varies by server, e-mail system, and number of users. Microsystems Software. 508-879-9000.

▼ **Morph 2.5.** This morphing and warping utility now includes a Curve tool, which enables users to outline images instead of setting many morphing points. It supports System 7.5 Drag and Drop, Apple Guide, and AppleScript. $149; upgrade, $49. Gryphon Software. 619-536-8815.



Discovering Utah. Skiers can hit the slopes with a wealth of information from this CD-ROM, which provides more than an hour of video clips, photos, maps, and reviews of ski resorts in Utah. Included in the package is a digital directory of lodging, transportation, dining, and entertainment options in Utah ski areas as well as a book of two-for-one ski coupons. $45. Mountain View Media. 800-241-8824 or 415-961-5409.

MACINTOSH PRICE INDEX

THE UNITED COMPUTER EXCHANGE index reflects average sales prices of new and used Macs as of November 4, 1994. Prices (except those for compact models and Performas) do not include a monitor or a keyboard. The United Computer Exchange is a national clearinghouse of used microcomputer equipment.

Mac Model	New	Used
SE/30 (5/40)	•	$525
Classic II (4/40)	•	$475
Color Classic (4/80)	•	$700
LC II (4/40)	•	$400
LC III (4/80)	•	$500
Performa 475 (4/160)	$1,299	$1,050
Performa 550 CD (5/160)	$1,599	$1,375
Performa 575 CD (5/250)	$1,849	$1,550
IIsi (5/40)	•	$400
IIci (5/80)	•	$625
IIfx (8/160)	•	$875
IIvx (4/80)	•	$800
Quadra 605 (4/80)	•	$650
Quadra 610 (8/160)	•	$975
Quadra 650 (8/230)	•	$1,550
Quadra 660AV CD (8/230)	•	$1,400
Quadra 700 (8/230)	•	$1,375
Quadra 800 (8/230)	•	$2,150
Quadra 840AV CD (8/230)	•	$2,325
Quadra 900 (8/230)	•	$1,700
Quadra 950 (8/230)	$3,599	$2,400
Power Mac 6100 (8/250)	$1,749	$1,500
Power Mac 7100 (8/250)	$2,499	$2,150
Power Mac 8100CD (8/250)	$3,899	$3,400
PowerBook 145 (4/40)	•	$825
PowerBook 145B (4/80)	•	$800
PowerBook 150 (4/120)	$1,449	$1,300
PowerBook 160 (4/80)	•	$1,275
PowerBook 165 (4/80)	•	$1,350
PowerBook 165c (4/80)	•	$1,400
PowerBook 170 (4/40)	•	$1,325
PowerBook 180 (4/80)	•	$1,700
PowerBook 180c (4/80)	•	$1,975
PowerBook 520 (4/160)	$2,099	$1,925
PowerBook 520c (4/160)	$2,699	$2,500
PowerBook 540 (4/240)	$3,099	$2,925
PowerBook 540c (4/320)	$4,699	$4,500
Duo 210 (4/80)	•	$775
Duo 230 (4/120)	•	$950
Duo 250 (4/200)	•	$1,475
Duo 270c (4/240)	•	$1,875
Duo 280 (12/240)	$3,099	$2,550
Duo 280c (4/320)	$3,599	$2,975

• = discontinued model

For more pricing information on these and other models, call 800-755-3033 or 404-955-0569, or find it on ZiffNet/Mac, in Library 1 (Special Reports) of the MacUser Forum (GO ZMC:MACUSER). On AppleLink, look for it in ZiffNet Selections:MacUser Software: Reference. On eWorld, go to shortcut MACUSER, in MacUser Software Library:MacUser Special Files.



PHOTOGRAPHY / LEON

Apple LaserWriter 16/600 PS, QMS 1660, and Xanté Accel-a-Writer 8200 / New class of office printers shines.

FOLLOWING CLOSELY on the heels of the HP LaserJet 4MV, a trio of new 600-dpi laser printers is heating up the race in the mid-volume-printer class. Called midvolume because they offer speed and capacity that are midway between those of workgroup and departmental printers, all three of the new 16-ppm Adobe PostScript Level 2-capable printers — the Apple LaserWriter 16/600 PS, the QMS 1660 Print System, and the Xanté Accel-a-Writer 8200 — offer solid feature sets at good price points. To help you decide which printer is right for you, MacUser Labs ran the new printers through a series of tests and compared the results with those of the HP LaserJet 4MV, the first printer to stake a claim on the midvolume-printer turf (see review, December '94, page 58).

Reviews Rating Key

★★★★★	Outstanding
★★★★	Very Good
★★★	Acceptable
★★	Poor
★	Seriously Flawed
💣	Dangerous

Apple LaserWriter 16/600 PS

Priced at about $2,400, the new Apple laser printer is the least expensive midvolume printer we evaluated, but it has the best overall speed and delivers the best output quality at 600 x 600 dpi. The trade-off is in its paper handling and high-resolution printing — unlike the new printers from HP, QMS, and Xanté, the Apple printer doesn't support tabloid-sized output nor does it offer resolutions higher than 600 x 600 dpi, as do the QMS and Xanté printers.

The Apple printer has a 25-MHz AMD 29030 RISC processor and comes with 8 MB of RAM, expandable to 32 MB. Network support is what you'd want from an office printer — built-in Ethernet, LocalTalk, and parallel interfaces, all active simultaneously — and the ability to automatically switch between PostScript and PCL 5.

The printer is smaller than its three competitors — it weighs 40 pounds and measures 17 inches wide, 17 inches deep, and 12 inches high. It can handle letter, legal, A4, A5, and B5 paper and comes standard with a 250-sheet letter cassette and a 100-sheet multipurpose tray.

For font storage, you can opt for Apple's $399 245-MB internal hard drive or plug an external hard drive in to the printer's HDI-30 SCSI port. An added plus is the ability to install the optional $309 Fax Card, which lets you send and receive PostScript and Group III faxes.

QMS 1660 Print System

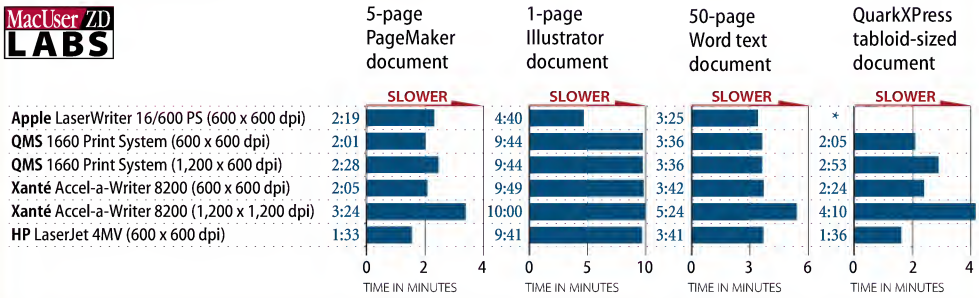
The QMS 1660 Print System uses the same type of Canon BXII engine as the HP LaserJet 4MV, but it can print at a higher resolution (1,200 x 600 dpi). Like the HP LaserJet printer, it can handle tabloid-sized paper.

The QMS 1660 Print System has a 33-MHz IDT 3081 RISC processor. Priced at $4,199, the base model comes with 12 MB of RAM and supports a resolution of 1,200 x 600 dpi for letter-sized output and a resolution of 600 x 600 dpi for tabloid-sized output. If you want to print at 1,200 x 600 dpi on tabloid-sized paper, you'll need to spend $900 on an additional 12 MB of RAM.

For networking, the QMS printer comes with a LocalTalk and a parallel interface; a $599 Ethernet kit is optional. The printer can automatically switch between PostScript and PCL 5 and also provides HP-GL emulation. For paper handling, you receive both a 250-sheet tray and a 100-sheet fold-down tray. For font storage, QMS offers an optional $599 127-MB internal hard drive.

One slight drawback to the QMS printer is that it's not as plug-and-play as its competitors — configuring it properly can be a little confusing.

Off to the Races / midvolume-printer speed



Xanté Accel-a-Writer 8200

The Accel-a-Writer 8200 also has a Canon BXII engine, and it offers an excellent price/performance ratio. With the highest resolution in the midvolume-printer class, Xanté's top-of-the-line 1,200-x-1,200-dpi model comes with 64 MB of RAM and costs $8,795. Xanté also sells a $4,495, 600-x-600-dpi model with 12 MB of RAM and a $5,295, 800-x-800-dpi model with 20 MB of RAM — each can be upgraded to higher resolutions by the addition of RAM. All models can print full-bleed, tabloid-sized output.

Equipped with a 33-MHz AMD 29030 RISC processor, the Xanté printer comes with basic networking features — a LocalTalk and a parallel interface — and the ability to automatically switch between PostScript and PCL 5. Support for HP-GL emulation is also included, and an Ethernet kit is available for $395. One caveat: Once you've installed Ethernet, you cannot simultaneously activate LocalTalk and Ethernet. The printer comes with a 250-sheet paper tray and a 100-sheet fold-down tray. For font storage, the printer comes with a SCSI port for connecting an external hard drive.

Print Quality and Speed

At 600 x 600 dpi, the Apple printer, with its PhotoGrade technology, delivered the highest-quality gray-scale output of all the printers in the midvolume-printer class (the HP printer was a close second). However, you need to equip the Apple printer with a total of 12 MB of RAM (it comes standard with 8 MB) to activate PhotoGrade. Gray-scale output from the QMS and Xanté printers was acceptable, and all the printers produced clean, sharp text and line art.

As we expected, at higher resolutions, the Xanté printer, with its 1,200-x-1,200-dpi setting and support for 116 shades of gray, produced the best-looking output overall — for gray-scale as well as text and line art.

The results of our speed tests using a Quadra 650 equipped with 16 MB of RAM and an Ethernet connection showed the Apple printer to be the fastest overall — it took the lead in all of our tests except the one with the 5-page PageMaker document (the Apple printer doesn't support tabloid-sized output and so was excluded from the QuarkXPress test). The Apple printer's speed advantage is partially a result of the shorter paper path it uses, compared with that of the devices that print tabloid-sized output.

Our PageMaker document tested the printers' ability to handle multiple file types (PICTs, TIFFs, gray-scale art, and downloadable fonts) within a single document. The clear winner in this test was the HP LaserJet 4MV. For higher-resolution printing of the PageMaker document, the QMS printer delivered the best speed, but what it gained in speed over the Xanté printer it lost in print quality.

To test speed for processor-intensive PostScript output, we used a 1-page Adobe Illustrator document. The Apple printer blew past the other printers in this test, completing its print job in about half the time required by the HP, QMS, and Xanté printers.

To check pure engine speed, we used a 50-page Microsoft Word document. Not surprisingly, the three printers with the same type of Canon engine — the HP, QMS, and Xanté printers — garnered similar results.

To test the speed of the HP, QMS, and Xanté printers for tabloid-sized output, we used a halftone image that was saved as a QuarkXPress document. At 600 x 600 dpi, the HP LaserJet 4MV was the fastest of the three, followed by the QMS printer.

The Bottom Line

For high-quality letter-sized output and excellent speed, you can't go wrong with an Apple LaserWriter 16/600 PS. For those who require tabloid-sized output, the HP LaserJet 4MV is our pick at 600 x 600 dpi, but it doesn't support the higher resolutions that the QMS 1660 Print System and the Xanté Accel-a-Writer 8200 do. The QMS printer provides a nice balance of speed and output quality for a midvolume office printer, but if you need the very-best-quality printouts, we highly recommend the Xanté printer. / Susan Janus and Roman Loyola

Apple LaserWriter 16/600 PS

Rating: 4½

Price: $2,430 (estimated).

Pros: Affordable. Fast. Excellent output quality. Fax option.

Cons: RAM upgrade required for PhotoGrade.

Company: Apple Computer, Cupertino, CA; 800-538-9696 or 408-996-1010.

Reader Service: Circle #401.

QMS 1660 Print System

Rating: 3½

Price: $4,199 (list).

Pros: Good balance of speed and output quality. Flexible paper handling.

Cons: Configuration options can be confusing. Mediocre high-resolution output.

Company: QMS, Mobile, AL; 800-523-2606 or 205-633-4300.

Reader Service: Circle #402.

Xanté Accel-a-Writer 8200

Rating: 4½

Price: Base model, $4,495; 1,200-x-1,200-dpi model, $8,795 (list).

Pros: Highest-quality full-bleed tabloid-sized output. Flexible paper handling.

Cons: LocalTalk and Ethernet can't be activated simultaneously.

Company: Xanté, Mobile, AL; 800-926-8839 or 205-476-8189.

Reader Service: Circle #403.

Painter 3.0 / Multimedia wizardry and a new look mark the latest release of Fractal's razzle-dazzle paint program.

FIRST DESIGNED to imitate natural media, Painter has grown into an enormously powerful and complex special-effects program. Painter 3.0 boasts new features for animation and cartooning, a completely new interface, layers support, and refinements to the program's already impressive paint tools. Icing on the cake is the new native Power Mac version, which gives Power Mac users an extra boost in speed.

Painting the Picture

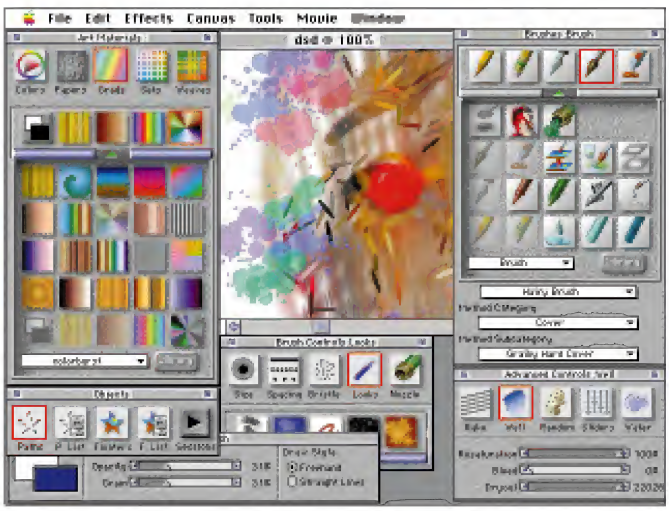
At its core, Painter consists of an excellent set of paint tools, such as chalks, crayons, oil paints, and pencils, that behave onscreen just as they would on paper and respond to changes in pressure if you're using a pressure-sensitive drawing tablet or pen. Its special-effects filters range from the ordinary to the psychedelic. You can also add Photoshop-compatible plug-in filters for even more effects. In addition, Painter provides a variety of simple image-enhancement features, such as those for selective color correction.

Painter 3.0 has an entirely new look that departs noticeably from the standard Mac design. We found that the program's new interface makes it hard at times to get to the tools you need. Earlier versions of Painter had 14 separate palettes, which could clutter the screen. Painter 3.0 has all of its tools, both new and old, consolidated in 8 palettes (Tools, Brushes, Art Materials, Brush Controls, Objects, Controls, Advanced Controls, and Color Set), each of which uses a drawer metaphor. In each of the palettes, the five most recently used tools appear on the drawer's top level and are immediately accessible. But if you want to use another tool, you have to "open" the drawer.

And although Painter has some truly useful features for customizing its interface, such as the ability to tear off a set of tools from a drawer and move it to a separate floating palette, other features, such as the ability to change the drop-shadow characteristics of the buttons or apply a different pattern to the drawers, seem downright frivolous.

Incorporating the features of its former add-on product, PainterX2, Painter now supports layers. You can convert any selection into a floating object and place it in a layer. Painter's layering includes basic hierarchical grouping that lets you create parent/child relationships among layers, which neither Photoshop 3.0 nor HSC's Live Picture can do. Beyond this, however, Painter's layers lack most of the sophisticated layer features, such as selective color blending, of Photoshop.

A new tool, the Image Hose, lets you spray a variety of shapes and textures onto the screen. The shapes and textures follow the direction of your mouse or stylus — for instance, if you spray arrows onto an image, the arrows will point in the direction you move the mouse. This is a fun feature for creating original textures and backgrounds, and you won't find anything like it in any other Macintosh graphics or animation package.



A new interface that uses a drawer metaphor is one of the most striking changes in Painter 3.0.

Animated Art

Multimedia artists and animators will be particularly pleased with Painter's new features for adding painting effects to QuickTime movies and for creating cartoons. With Painter 3.0, you can create your own animations by drawing a series of frames and saving them in QuickTime format. A terrific onionskin feature allows you to view as semitransparent overlays a combination of five frames before and after the current frame. A VCR-like interface makes it simple to flip between the animation frames.

If you prefer more-realistic action, you can import a QuickTime movie into Painter and work with it as a series of still images, painting on the images or applying filters to them. Our only complaint is that you can't paint directly on a movie while it's actually playing. As a workaround, you can record a painting session and play it back over a movie, although you have no control for synchronizing the session with the movie.

Painter's brushes have also been greatly enhanced in version 3.0. In addition to providing the simple circle brush included in previous versions, the new release lets you create your own custom brushes from any paint image. And you can opt for bristle effects as you paint, so your strokes look even more realistic than before.

You can create custom paths and turn them into masks, using path-creation tools, which include an Illustrator-like pen editing tool. Gradient Composer lets you fill selections with customizable linear, sweeping, or radial gradients and change the colors in an image by remapping them according to a color gradient. Other noteworthy additions include a drop-shadow tool and an image-warping feature.

One very unusual feature in Painter 3.0 is the Weaves palette, a "virtual loom" that lets you create your own patterns and use them as fills. The program comes with two libraries of traditional weaves that you can



The new Weaves palette is a virtual weaving loom that lets you create a wide variety of fabric and tiling patterns.

modify, and you can create your own from scratch.

Although it's serviceable, Painter's documentation is poorly organized and at times unclear. It does a less than successful job of explaining some of the more complex aspects of the new Painter, which is a pity, considering the sheer depth and power of the latest release.

The Bottom Line

Painter 3.0 is a powerhouse addition to the Mac's graphics toolbox. Although the program's new interface and complex features take a bit of time to master, you are rewarded with dazzling special effects and features other programs don't have. And Painter is unmatched in its ability to make the most of pressure-sensitive drawing tablets. / David Biedny

Painter 3.0

Rating: ❦❦❦❦

Price: $499 (list).

Pros: New animation and rotoscoping features. Built-in layers. Fun Image Hose tool. Power Mac-native.

Cons: New interface can be cumbersome. Inadequate documentation.

Company: Fractal Design, Aptos, CA; 408-688-8800.

Reader Service: Circle #404.

FileMaker Pro Server / The Mac's premier database program gets a big speed boost.

THE LAST WORD in flat-file database programs for the Mac, Claris' FileMaker Pro is a great single-user program, but it suffers from poky performance in multiuser environments. FileMaker Pro Server remedies that problem with a client/server architecture that significantly boosts multiuser performance.

Server Statistics

FileMaker Pro Server requires a dedicated Mac. It can support as many as 100 concurrent Mac and Windows users over an AppleTalk network (compared to the previous version's 25). The package comprises the server software and the latest version of the FileMaker Pro client software. You must use version 2.1v3 or later of the client software with the server application to benefit from the server software's performance improvements.

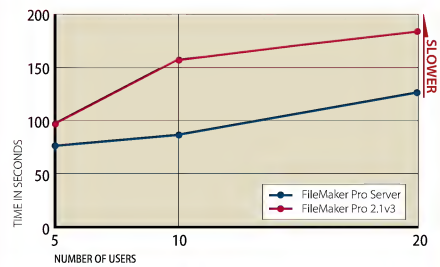
Installing the server software is a snap — we had it running in minutes. Once you've installed the server software, any FileMaker database file that's in the same folder as the server software opens automatically with the server application.

In our speed tests comparing FileMaker Pro Server with FileMaker Pro 2.1v3 using a Quadra 840AV and an 8,000-record database, we experienced impressive speed gains with the server software. We varied the number of clients simultaneously accessing our test database, using 5, 10, and 20 clients, and ran a series of real-world scripts. When we averaged our test results, FileMaker Pro Server showed as much as a 100-percent speed improvement over FileMaker Pro. The biggest jump in speed occurred when we increased the number of users from 5 to 10.

We liked the speed improvements FileMaker Pro Server offers but were disappointed with the functionality of its administration tools. The server software presents a bare-bones interface that provides network administrators with basic information, such as the number of users accessing each database and the number of open databases. You can also disconnect users, limit the number of concurrent users, and open additional databases from the server.

But what's frustrating is that the server software doesn't let you see or modify information in database files, and you can't alter the database by, for example, adding or deleting fields. To do these things, you must first close the server application, open the database file with the client software, make your changes, and then open the server application again.

FileMaker Pro Server Performance



MacUser ZD LABS **To see what speed gains** FileMaker Pro Server gave us over FileMaker Pro, we ran a variety of real-world scripts with 5, 10, and 20 users.

FileMaker Pro Server is available for the 680x0 as well as the Power Mac platform. Because it's a highly disk-intensive application, we recommend running FileMaker Pro Server with a hard drive that supports asynchronous disk I/O.

The Bottom Line

FileMaker Pro Server is an exceptional application for workgroups of five or more users who require simultaneous access to FileMaker Pro databases. The server software's administration tools fall short, but the speed gains FileMaker Pro Server delivers over FileMaker Pro more than make up for its lack of tools. / Blake Roberts

FileMaker Pro Server 2.0v1

Rating: 4½

Price: $1,499 (list).

Pros: Substantial speed improvements over FileMaker Pro. Easy to set up and use.

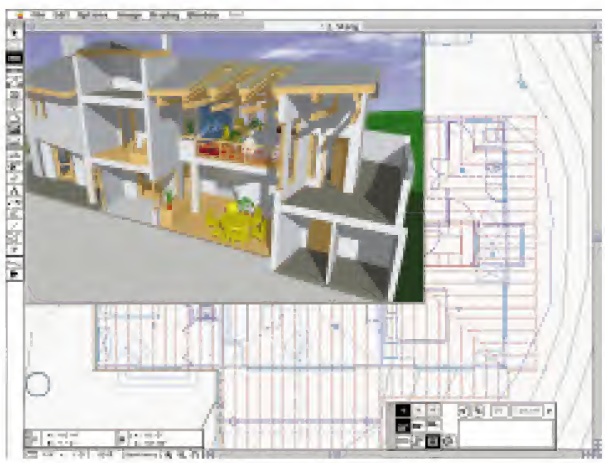
Cons: Limited administration tools.

Company: Claris, Santa Clara, CA; 800-325-2747 or 408-987-7000.

Reader Service: Circle #405.

ArchiCAD 4.5 / Every detail, from floor plan to walk-through, has its place in this powerful architectural-CAD program.

THREE TIMES AS FAST in native Power Mac mode than on a Quadra 800, ArchiCAD 4.5, Graphisoft's integrated 2-D/3-D architectural-CAD system, takes advantage of all the processor power it can get. Additionally, ArchiCAD now keeps track of more information for each detail of your building in its internal database, uses flexible parametric library symbols, gives you a wide variety of construction materials to work with, and shows the reflectivity and optical transmittance of surfaces.



Offset sectionals in the 3-D view are created instantly as you draw your floor plan with ArchiCAD 4.5.

From Sketch to Blueprint

Unlike less expensive architectural-CAD programs, such as Artifice's DesignWorkshop and Alias UpFront, both of which primarily create 3-D walk-throughs of buildings for architects' clients, ArchiCAD lets you create designs and blueprints for engineers and construction contractors. As you create a floor plan in ArchiCAD's 2-D view, the program automatically generates a 3-D model. Every element in your design — doors, windows, walls, roofs, and floors — has corresponding data stored within ArchiCAD about its height and volume and the material it's made of. Graphisoft includes more than 600 3-D and 2-D parametric symbols in its Geometric Description Language, all of which you can edit as you use them to fit your design. (For instance, you might have a parametric window symbol with a fixed height but with a variable width measurement.) ArchiCAD can also generate bills of materials, making the process of tallying door and window schedules a trivial process instead of a chore.

With the new Section/Elevation tool, you can draw lines to define offset sectional views and sectional elevations directly on your 2-D floor plan. Since ArchiCAD is a true solids-based modeler, sectional views of construction materials appear solid in 3-D and contain the appropriate fill pattern in 2-D. You can use ArchiCAD's drafting tools in sectional views to create detailed working drawings marked with dimensions, your notes, and standard architectural symbols. ArchiCAD 4.5 now also has a continuous-curve tool — missing in earlier versions — that you can use to create curved elements.

You have to make all changes in the 2-D window and enter information about each element in your design in dialog boxes. Although many architects will prefer working on a familiar floor-plan layout in the 2-D window, we would also like to be able to place and edit elements in the 3-D window, a feature Graphisoft says it plans to include in a future version.

A Virtual Tour

Creating an impressive walk-through of your design is easier now with ArchiCAD 4.5's improved presentation and rendering capabilities. You can put a variety of surfaces, such as iron, leather, marble, wood, and plaster, on your elements as well as use bit-mapped images to represent wallpaper or stucco, for example. Besides being able to put any color onto a surface, you can designate its reflectivity (diffuse or specular), transparency, and emissivity. You can also put in more than one light source and have the lights cast shadows. And whereas previously you had to place cameras at various places throughout your design and switch views among them to create a walk-through, the Camera tool is now completely interactive and follows the animation path you set.

Although ArchiCAD 4.5 can run on most 68040 Macs (or 68030 Macs with a math coprocessor), we strongly recommend using a Power Mac with at least 32 MB of RAM. Like many high-end CAD programs, ArchiCAD 4.5 can import a variety of formats, including DXF, GDL, PICT, Swivel, and ZOOM files, and it can export DXF, EPS, GDL, HP-GL, PICS, QuickTime, RIB, StrataVision, and topCAD files. It's also fully cross-platform: ArchiCAD for Windows is able to read any files created in ArchiCAD for Mac and vice versa. Unfortunately, ArchiCAD 4.5 also comes with hardware copy protection.

The Bottom Line

For those who need to create only 3-D walk-throughs on their Macs, Alias UpFront, Virtus Walkthrough, and Artifice's DesignWorkshop are easier to learn and less expensive than ArchiCAD 4.5. But for those who want to create blueprints at the same time, ArchiCAD's integration between 2-D and 3-D, its speed on the Power Mac, and its ability to keep track of each design detail make it an indispensable architectural tool. / Jim Anders

ArchiCAD 4.5

Rating: 4½

Price: $4,450 (list); upgrade from 4.0, free.

Pros: Workstation-level speed on Power Macs. Excellent 2-D/3-D integration. Cross-platform support.

Cons: No editing in 3-D view. Hardware copy protection.

Company: Graphisoft, South San Francisco, CA; 800-344-3468 or 415-737-8665.

Reader Service: Circle #406.

Fargo Primera Pro / Fargo does itself one better with a successor to the Primera color printer.

NOT EXACTLY A SPEED DEMON from the start, the Fargo Primera dye-sublimation/thermal-wax printer nonetheless gave MacUser ZD LABS cost-conscious business buyers an affordable option for photo-realistic color printing. But the printer lacked both PostScript and networking support. Now, for about $400 more than the price of the original Primera, you can buy the new Primera Pro, which not only comes equipped with a LocalTalk connection and Adobe PostScript Level 2 but can also print at a higher resolution than its predecessor.

Alike but Different

As with its predecessor, the beauty of the Primera Pro is that you are able to print in thermal-wax mode until you've perfected your document and then switch to dye-sub mode (which uses expensive consumables) for your final printout — all with one printer.

The Primera Pro looks just like the original Primera, and it has the same compact 14-x-6-x-10-inch dimensions as its predecessor, but the similarities end there.

Unlike the original Primera, the Primera Pro comes equipped with a LocalTalk connection. You'll probably want to buy the optional Ethernet connection ($499.95), however, considering that the Primera Pro is even slower than the Primera.

The Primera Pro takes a speed hit due to its higher, 600-x-300-dpi resolution, compared with the original printer's 203 dpi (which earned it the nickname "the color fax"). But the Primera Pro not only produces higher-quality color and better-looking images than its predecessor but it also produces crisper and cleaner text. You also have the option of printing at 300 x 300 dpi or in draft mode at 75 x 75 dpi.

Last but far from least, the Primera Pro supports Adobe PostScript Level 2. The Primera Pro's PostScript interpreter is software-based and lacks both on-board memory and a processor, relying on the processing power of your Mac to render images.

To make setup of the Primera Pro easy, Fargo provides an installer that automatically places the printer software in the appropriate places on your hard disk. To switch between dye-sub and thermal-wax printing, you change the ribbon and then switch modes with the driver software. One caveat: Monitor your options carefully, lest you find yourself, as we did, accidentally printing in thermal-wax mode using expensive dye-sub consumables and vice versa. To eliminate this hassle, we'd like to see Fargo add a sensor to the printer that tells you what kind of ribbon is being used.



PostScript and networking support are hallmarks of the new low-cost Fargo Primera Pro dye-sub/thermal-wax printer.

To gauge the speed trade-off involved in boosting the Primera's print resolution, we compared the Primera Pro with the Primera, using test documents created with Adobe Photoshop and Microsoft PowerPoint. We tested each printer in thermal-wax as well as dye-sub mode. For all tests, the Primera Pro's resolution was set at 600 x 300 dpi (the Primera's resolution was, of course, a fixed 203 dpi). Our test platform was a Quadra 650 that had 16 MB of RAM and a Quantum 500-MB drive. We used the LocalTalk connection with the Primera Pro and a serial-to-parallel cable with the Primera to connect the printers to our test Macintosh.

Not surprisingly, the Primera Pro was slower than its predecessor in all our tests. In thermal-wax mode, the Primera Pro took 5 minutes to print the Photoshop document whereas the Primera finished in 4 minutes. The Primera Pro took 10 minutes to print our two-page PowerPoint document; the Primera required 8 minutes.

The printers produced similar results in dye-sub mode. The Primera Pro took 15 minutes to print the Photoshop document, compared to the Primera's 11 minutes. The PowerPoint document took 50 minutes to print with the Primera Pro and 45 minutes to print with the Primera.

Overall, compared with more expensive, faster, and more conventional thermal-wax and dye-sub printers, both the Primera Pro and the Primera operate, on average, about 50 percent slower.

However, if you can put up with the Primera Pro's snail-like performance, you'll find that it delivers quite acceptable output for business documents. Color gradations, tones, and clarity are much improved, and text boasts smoother curves and serifs. Moreover, when we printed complex images, although some of the minor registration problems we noted with the Primera's output were still present in the Primera Pro, the new printer produced considerably less banding and gave us deeper blacks.

The Bottom Line

If your office is looking for an inexpensive color proofing device, you should check out the Fargo Primera Pro dye-sub/thermal-wax printer. It won't give you the output quality and speed that graphics professionals demand from the printer's higher-priced competitors, but if your main concern is cost, the Primera Pro is well worth considering. / Roman Victor Loyola

Fargo Primera Pro Color Printer

Rating: ♦♦♦½

Price: $1,895; optional Ethernet connection, $499.95 (list).

Pros: Inexpensive photo-realistic color output. PostScript and networking support.

Cons: Slow. Relies on host Mac for processing. No consumables indicator.

Company: Fargo Electronics, Eden Prairie, MN; 800-327-4622 or 612-941-9470.

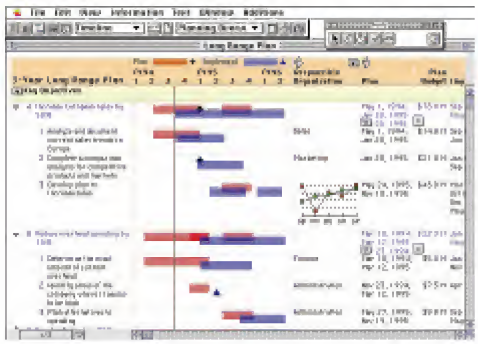
Reader Service: Circle #407.

InfoDepot 2.0 / Chena serves up a smorgasbord of powerful tools for managing project details.

MIX ONE PART OUTLINER and one part table generator. Blend in a dollop of database and a spoonful of spreadsheet. Add a calendar and Gantt charts, and drench with drag-and-drop. Season to taste with PowerTalk, Apple events, and AppleScript. Pour over custom forms. Decorate with color graphics, movies, and customized tool palettes, and what do you end up with? Chena Software's InfoDepot. Chena's concoction takes some getting used to, and it may prove too rich for many palates. But for those who acquire the taste, InfoDepot adds up to one amazing information-management tool.

Views R Us

The best way to grok InfoDepot 2.0 (called version 2.0 because it's the successor to Chena's Fair Witness package) is to consider the array of views it offers. New documents open in Outline view. Switch to Table view, and InfoDepot starts to look like Attain's In Control — to the right of your outline, you can add more information to any number of columns. To speed data entry, you can create custom pick lists or have the program complete your words as you type.



Managing big projects and diverse information is InfoDepot's forte. The Timeline view, shown here, takes date information from the program's Table view and turns it into a Gantt chart.

But InfoDepot's columns offer many more options than In Control's. Any cell in any column can contain pictures, movies, or sounds as well as text and numbers. You can add icons that take you with one mouse click to other documents in other applications. You can create formulas for numbers and dates and use operators such as After and Start + x to define project-management-style dependencies for events. Custom columns let you set up special-purpose counting systems in your tables — a column that works with SMPTE time codes, for example.

But the real fun begins when you switch to InfoDepot's remaining views. The Timeline view turns date information in your table into a Gantt chart, with intervals ranging from half an hour to a century. (Dated items also appear in a standard calendar, although in InfoDepot's occasionally confusing terminology, that's a palette, not a view.)

In the Form view, you can design a custom layout for displaying or editing data one row at a time. You can choose which columns you want to include, add color and graphics, and use rulers and a snap-to grid to get just the look you want.

The free-form Chalkboard view displays data from multiple rows, but only from the outline column. It lets you highlight ideas and visualize relationships without the outliner's constraints. Tablets are special Chalkboard documents that resemble legal pads — anything you jot down on a tablet shows up in the underlying outline.

There's more. You can make InfoDepot documents available to your colleagues by simply clicking on the Share button, which saves documents to a shared volume. Multiple users can open and edit a shared document at the same time. For confidential data, an administrator can create passwords that limit read and write access on a column-by-column basis. If PowerTalk is installed, you can use digital signatures to certify the integrity of any portion of a document or of the whole thing.

InfoDepot makes extensive use of drag-and-drop — you can drag rows, events, and glossary items — even style sheets. But the program's most impressive use of Apple technology is its Apple-events implementation. System 7 users are able to control the program with scripts, attach scripts to cells, and record scripts that automate tasks. They can even write scripts that modify or extend InfoDepot 2.0's own commands. The program supports all major Apple-events suites, including the charting, table, word-services, and collaborative-information suites.

Compiled scripts stored in a special InfoDepot Additions folder appear in a menu within the program. Predefined additions can pull in address and phone information from Apple-events-aware PIMs, send data to Now Up-to-Date, or use Microsoft Excel to produce 3-D charts. A Picture Grabber script places a thumbnail view of a selected graphic into an InfoDepot cell, along with a connection icon that opens the original image.

InfoDepot is a powerful tool for managing lots of related tasks, but its wealth of options can make it confusing. Moreover, tool and command icons are often cryptic and have no text labels or even Balloon Help. And instead of pop-up menus for changing numerical formats, the program makes you type in gibberish (such as $#,###,##0.00). New documents open with their title bar under the InfoDepot command palette, so you have to move one or the other to get to the close box.

The Bottom Line

Interface shortcomings aside, InfoDepot offers extraordinary range and flexibility. It's overkill if all you want to do is maintain a routine to-do list, but if you need to coordinate a big project and lots of diverse information, there's nothing else like it. Fair Witness users can upgrade to InfoDepot for $89. A native Power Mac version should be available by the time this review appears.

/ Henry Norr

InfoDepot 2.0

Rating: ❦❦❦❦

Price: $295; five-user pack, $1,050 (list).

Pros: Numerous views of diverse data. Highly customizable. Multiuser. Strong support for Apple events.

Cons: Options can be confusing. Quirky interface.

Company: Chena Software, Allentown, PA; 215-770-1210.

Reader Service: Circle #408.

MacDraft 4.0 / IDD's entry-level drafting tool gains a new look and sophisticated reporting capabilities.

A DATABASE WITH A REPORT generator plus new floating palettes and additional tools for drawing and editing mark the latest release of Innovative Data Designs' accessible drawing and drafting program. With its well-designed interface and easy-to-use tools, MacDraft 4.0 is tailor-made for users who have little or no drafting experience.

More Palette-able

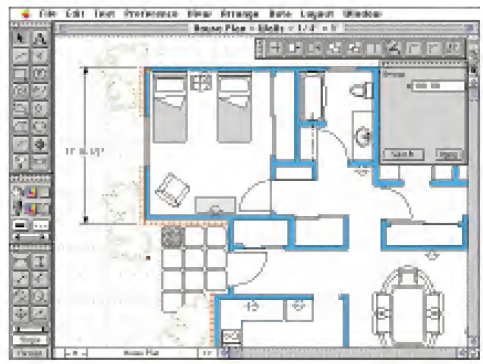
MacDraft 4.0's new floating palettes let you complete drawings faster and more easily than before. In place of the previous version's single tool palette, version 4.0 displays several well-organized smaller palettes that expand and enhance the program's functionality.

The main tool palette contains several new tools, including ones for drawing parallel offsets for lines, circles, and arcs. Missing, however, is a tool for creating general offsets. Additionally, to help you navigate within your drawings, the palette includes a new 1:1 button that gives you a nonmagnified view of the area you're working on.

Other palettes include one for dimension tools and one that groups general tools, such as the fillet and the chamfer, with MacDraft's new Boolean tools. The Boolean tools let you either add two objects together to form a new polygon or subtract one object from another to form a new shape. Although these tools are useful, they have several limitations that make them unsuitable for creating complex shapes. Once you've used them to create an object, you lose the ability to edit it — you can only resize it. In addition, the subtract tool doesn't work with objects that have holes.

A big plus with MacDraft 4.0 is that it overcomes the limitations on object scaling and duplication that existed in the previous version. Resizing objects is a snap with the new Resize palette, which lets you enter numeric values for object dimensions. MacDraft displays the correct measurement parameters in the palette, based on the type of object you have selected — width and height for rectangles, for example, and percentages for object groups.

Another welcome new feature is MacDraft's sophisticated duplication tool. Using the Linear Duplication option, you can duplicate objects linearly in rows and columns. The Circular Duplication option creates an array of shapes around a specific point.



New floating palettes make MacDraft 4.0 even easier to use than previous versions.

MacDraft 4.0 also adds DXF (Document Exchange Format) import and export for users who need to exchange drawings with other CAD programs. This feature is useful for those who are not CAD professionals but need to use technical drawings. Space planners, for example, may want to use DXF building layouts as a starting point for facilities management. In our tests, MacDraft was able to import our DXF test files, although we did have to remove some elements from the original drawing, because MacDraft doesn't support all DXF object types.

Database and Reports

IDD has done a good job of refining MacDraft's basic functionality, but the most significant enhancement in version 4.0 is the addition of a database with a report generator. You can now assign information to objects in a drawing and extract it in report format, so, for example, you can determine the cost of a project or how many items of a specific kind are in a drawing.

MacDraft's database provides five user-definable fields, including name, type, and manufacturer, for attaching information to objects. The Find/Replace function lets you reassign information if you decide you want to make global changes to a drawing, such as changing the manufacturer for a group of objects. However, if you want to change the attributes for some, but not all, of a group of objects by using Find/Replace, MacDraft doesn't make it as easy as it could be. First, it would be helpful to be able to view the objects you want to edit, so you can determine exactly which ones you want to change and exactly how you want to change them. In addition, the Edit Object Info command works with only a single object at a time, which makes the process of reassigning information to multiple objects tedious.

MacDraft's report generator uses a spreadsheetlike window. You can create multiple reports from a single drawing and extract object information such as area, height, length, perimeter, width, *x* dimension, and *y* dimension. If you need report functions that are more powerful than those provided by MacDraft, you can replicate a report as an Excel worksheet by simply clicking on MacDraft's Apple events-driven cloning button. You can even create live links between your drawing and the Excel worksheet so that when you make changes to your drawings, the corresponding object information also will be updated in the worksheet.

The Bottom Line

MacDraft is an excellent tool for creating floor plans and technical drawings and is the best program we've seen for users with little or no drafting experience. It's also the only program in its class that incorporates a database and report generator — both of which are extremely useful tools for doing cost estimation. / Sean J. Safreed

MacDraft 4.0

Rating: ♦♦♦♦

Price: $449 (list).

Pros: Well-designed interface. Easy-to-use tools. Database and report generator.

Cons: Can't create complex shapes.

Company: Innovative Data Design, Concord, CA 94520; 510-680-6818.

Reader Service: Circle #409.

Being There Pro / Videoconferencing tool that's not quite ready for prime time.

VIDEOCONFERENCING SOFTWARE may sound like a practical solution to the problem of trying to get several people in an office together for a meeting. But as Being There Pro demonstrates, it's still a nascent technology that promises more than it delivers.

Being There Pro allows networked Macs to exchange digitized video images and sound, so you can watch, listen to, and speak with other users on your network. You can also share, mark, and annotate documents on-screen.

Setting up Being There isn't easy: The video-configuration dialog boxes do a poor job of helping you sort out the configuration options. You must set your video-input-signal type (composite or S-Video 1), and the thin manual provides little straightforward help. If you have older video equipment or it doesn't conform to the NTSC (U.S.) video standard, you're in for even more configuration pains. The manual doesn't mention how to handle PAL, SECAM, or other kinds of non-NTSC video.

Once set up, Being There worked reliably in normal peer-to-peer collaboration mode on our Quadra AV and Power Mac test platforms. Over an Ethernet network, sound quality was about on a par with that of an AM radio and video quality was about as good as that of a QuickTime movie.

To use it, you need an AV Mac or a Mac with a video-digitizing card as well as a video camera and an Apple microphone. The program works over any AppleTalk-compatible network — we recommend using an EtherTalk network, however, because sound and video quality degraded significantly on slower LocalTalk networks.

Being There Pro isn't bundled with any hardware, but it works with any video camera or camcorder that can plug in to your Mac's (or video-digitizing board's) video-input port. For a good video image, we recommend using a medium- to high-end video camcorder, such as the Sony Hi-8MM and JVC SVHS; cheaper cameras in the $100 range produced grainy images that were hard on the eyes.

The Bottom Line

If you *really* need videoconferencing and have the hardware and net in place, Being There Pro will do fairly well. But, as Being There Pro's speed, configuration, and reliability problems demonstrate, Mac videoconferencing isn't good enough yet to substitute for a face-to-face meeting. / Don Crabb

Being There Pro 1.0

Rating: ❦❦❦

Price: $599 (list).

Pros: Usable audio/video/document conferencing.

Cons: Complicated setup.
Nonfunctioning broadcast mode.

Company: Intelligence at Large, Philadelphia, PA; 800-425-7638 or 215-387-6002.

Reader Service: Circle #410.

Apple Power Macintosh Upgrade Card and DayStar 80 MHz PowerPro 601

Supercharge your Quadra with a PowerPC upgrade card.

GREEN WITH POWER MAC envy? If you are a Quadra owner, you can upgrade your machine to Power Mac status by installing a PowerPC-based upgrade card. Cost-conscious buyers can opt for the Apple Power Macintosh Upgrade Card, street-priced at about $600. Prepress professionals who frequently do CPU-intensive image processing may want to consider the $1,899 DayStar 80 MHz PowerPro 601. The DayStar card is pricey — especially after you've added the RAM required for optimal performance — but even with the cost of the additional RAM factored in, the DayStar card still saves you approximately $2,000 over the purchase price of a brand-new Power Mac 8100/80 equipped with enough RAM for prepress applications.

Apple Power Macintosh Upgrade Card

The Apple upgrade card employs a clock-doubling scheme that allows the computer to run at twice the clock speed of the host computer, so if you own a 33-MHz Quadra 950, it will run at 66 MHz when equipped with the Apple upgrade card running in PowerPC mode.

Although the Apple upgrade card is smaller than the DayStar card, each card plugs in to the PDS of your Mac and blocks the use of one NuBus slot (unfortunately, if you have an AV Quadra, you can't take advantage of either card, because those machines lack a PDS). A potential drawback of both cards is that although the PowerPC chip on each comes with a 64-bit-wide bus, the PDS data path is only 32 bits wide, so it creates a performance bottleneck. To help alleviate this problem, the Apple card comes with 1 MB of secondary-cache RAM, but it isn't otherwise expandable.

Each card lets you switch between 68040 and PowerPC mode by using a control panel. The Apple card's control panel provides a rudimentary on/off toggle that enables and disables PowerPC mode. The Apple card also requires that you shut down completely to switch processors, whereas the DayStar card lets you switch between PowerPC and '040 modes immediately after restarting.

Unfortunately, because of the Apple card's clock-doubling scheme, you'll likely be disappointed with the speed boost the card provides on low-end, 25-MHz Macs such as the Centris 650, Quadra 610, and Quadra 700.

DayStar 80 MHz PowerPro 601

The PowerPro 601 card always runs at its maximum 80-MHz clock speed, no matter what Macintosh model it's installed in. To alleviate the PDS bottleneck, DayStar has equipped the card with a 1-MB secondary cache. The card works with RAM already present in your computer and features four 72-pin SIMM slots that may be filled with as much as 128 MB of RAM that can be accessed directly with the PowerPC chip's fast 64-bit capability — a must-have option for prepress users who want to squeeze every bit of speed out of the card.

The PowerPro's control panel not only lets you switch between 68040 and PowerPC mode (not as important a feature now as it was six months ago, when few native Power Mac applications were available) but it also lets you control various aspects of the card. The PowerBoost option, for example, copies system-ROM code into any RAM installed on the PowerPro card. Cache-related controls include those for motherboard RAM caching and PowerPro RAM caching, as well as a safe-cache mode for potential compatibility problems with some NuBus cards.

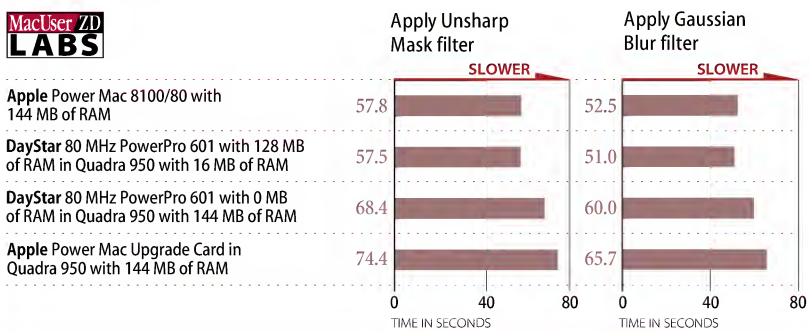
As an added incentive, registered PowerPro users are given the option of receiving free copies of either PhotoMatic and ColorMatch or PowerStart and PowerPreview. Another key advantage of the PowerPro is that you can upgrade it with faster PowerPC chips as they become available — DayStar expects to have a 100-MHz version available by the time you read this, for example. Apple doesn't offer Power Mac owners the ability to upgrade to faster PowerPC chips.

Compatibility and Performance

In our software-compatibility tests, we found both cards to be solid for running Macintosh applications.

To gauge the speed provided by the PowerPro and the Apple upgrade card, we

Supercharge Your Quadra / PowerPC-based upgrade cards



The speed boost with the Apple Power Mac Upgrade Card wasn't as impressive as those with the DayStar 80 MHz PowerPro 601, but budget-conscious buyers will like the Apple card's $600 price tag. The Quadra 950 containing a PowerPro card configured with 128 MB of RAM successfully kept pace with the Power Mac 8100/80, but the card is pricey — it will appeal most to high-end prepress professionals.

installed each separately in a Quadra 950 equipped with 144 MB of RAM. As a test file, we used an 18-MB Photoshop document, which we ran in a 72-MB memory partition, using Photoshop 3.0. To see how additional RAM affected the speed boost the PowerPro provided, we tested it with and without its maximum 128 MB of local 64-bit RAM. When we added the 128 MB of RAM to the card, we removed that much from the Quadra, maintaining a total of 144 MB of RAM in the system. We then compared our results with those of a Power Macintosh 8100/80 with 144 MB of RAM.

The Quadra with the PowerPro fully configured with 128 MB of RAM yielded results nearly identical to those of the Power Macintosh 8100/80. Without the additional RAM, the speed boost the card provided wasn't nearly as impressive. The Quadra with the Apple upgrade card installed didn't match the speed of the Power Macintosh, but considering the card's low price, the Apple upgrade card came close enough to make it a worthwhile investment for buyers on a budget.

The Bottom Line

The Apple Power Macintosh Upgrade Card offers the most affordable route toward Power Macintosh speed for Quadra 650, 800, and 950 owners. However, it doesn't provide much of a speed boost in 25-MHz Quadras, such as the 700, and it won't be able to meet the demands of high-end prepress professionals.

If that description fits you, the DayStar 80 MHz PowerPro 601 is worth considering, but only if you add 72-pin RAM to the card — the same RAM you'd be adding to a new Power Macintosh. Configuring the card with the maximum additional RAM boosts its price to about $2,700 — an expensive approach, to be sure, but if you want the ultimate in speed without trading in your high-end Quadra for a Power Macintosh, it's the only way to go. DayStar offers excellent technical support and a three-year warranty. An added plus is DayStar's upgrade policy, which lets you upgrade the PowerPro with faster PowerPC chips as they become available. And because DayStar uses ROM code licensed directly from Apple, its cards will continue to offer compatibility equal to that of a genuine Apple product. / Jeffrey K. Milstead

Apple Power Macintosh Upgrade Card

Rating: 3½

Price: $600 (street).

Pros: Easy installation. Inexpensive.

Cons: Provides little speed boost on 25-MHz Quadras.

Company: Apple Computer, Cupertino, CA; 800-767-2775 or 408-996-1010.

Reader Service: Circle #411.

DayStar 80 MHz PowerPro 601

Rating: 3½

Price: $1,899 with secondary cache (estimated).

Pros: Provides impressive speed boost, even in slower, 25-MHz Quadras. Well-designed software controls. Upgradable.

Cons: Expensive. Additional RAM required for maximum speed boost.

Company: DayStar Digital, Flowery Branch, GA; 800-962-2077 or 404-967-2077.

Reader Service: Circle #412.

VideoShop 3.0 / Bargain-priced QuickTime video editor is feature-rich but rough around the edges.

WITH AN AGGRESSIVE $395 price, new features, and bundled sound and royalty-free movie files, VideoShop 3.0 could rank with Adobe Premiere 4.0 in the field of top video-editing tools, especially for desktop-video hobbyists, who don't require high-quality output to video. But, unfortunately, this latest release suffers from inconsistent performance and some buggy behavior. And contrary to Avid's claim that VideoShop is "the video software anyone can use," learning how to use it is not exactly an easy process.



The new Info palette in VideoShop 3.0 can give you useful information about your movie projects, but it doesn't make the program easier to use than competing products.

Drag-and-Drop Editing

If you're using a specific folder to store all your QuickTime-media files, you can see and sort all the files in that folder in VideoShop's Desktop window. In addition to being able to sort your folders and files by type, size, date, and other criteria, you can double-click on items in the Desktop window to have VideoShop open them in a QuickTime player window. What makes the Desktop window more practical than a Finder-within-a-program is its ability to show VideoShop's unique moving icons, called Micons. Other programs show the first frame of a QuickTime movie as a static thumbnail picture, but VideoShop's Micons are anything but static. By default, 60 frames of a movie loop when you select a Micon.

To begin editing a movie, you can either drag the file from VideoShop's Desktop window into the Sequencer window or use the Open command to show a QuickTime clip in its player window and then drag the clip to the Sequencer window. Although Avid's internal drag-and-drop works well, we would like to have seen support for Apple's drag-and-drop architecture from the Finder.

You do most of your work in the Sequencer window, where you splice clips together and add effects. VideoShop plays the results of your edits in the Canvas window. The program has an excellent collection of filters and transitions, and it supports a wide variety of file formats, including AIFF, PICS, Audio CD and MIDI for sound, and PICT and PhotoCD for graphics. For those who do rotoscoping, VideoShop comes with excellent QuickTime import/export plug-ins that let Adobe Photoshop and Fractal Design's Painter import and export QuickTime movies. It even has a special Titling window you can use for adding fixed and scrolling titles to your movies.

Instead of piecing together a QuickTime movie with transitions and filters in one window and then spending several minutes — or hours — rendering your final construction, VideoShop breaks the time-consuming process into bite-sized pieces, rendering just the current selection as you apply an effect to it.

We found the Sequencer window to be the source of most of VideoShop's shortcomings. When you drag a clip to it, the program doesn't give you any visual feedback or control over where the clip is placed; in contrast, Premiere highlights the frames in its construction window to show you exactly where your clip goes. The Sequencer window has 17 icons around it for video-editing features such as Apply Filter and Jump to Next Clip and includes two new icons for Quick Fade-in and Quick Fade-out. As you move the cursor over the icons, their names show up in the new Info palette. At first we found the icons a bit confusing; some hot tips or Balloon Help would be very welcome here.

VideoShop's PowerPC plug-in speeds up the time it takes the program to apply filters and transitions from 100 to 150 percent, according to Avid, and in this aspect, VideoShop was fairly quick with simple movie constructions on our Power Macintosh 8100/80.

Keep It Simple

Version 3.0 is considerably more stable than version 2.0, but it still isn't as robust as it should be. Large audio clips and complicated film constructions severely degraded VideoShop's speed and caused our machine to crash when we applied transitions, using the high-quality setting. Avid says using QuickTime 1.6.2 or earlier corrects these



With the new Trim Dialog window in VideoShop 3.0, you can crop the in and out points of any two abutting film clips — especially useful for creating smooth transitions.

problems, even though VideoShop 3.0 supports only QuickTime 2.0. VideoShop 3.0.2, due out by the time you read this, will also support QuickTime 1.6.1. Additionally, we experienced intermittent screen problems: VideoShop sometimes lagged in its on-screen response when we selected information in the Sequencer window.

Video-Hardware Support

VideoShop works with any QuickTime-video card, and if you use a top-of-the-line card, such as the Radius VideoVision Studio, it can turn your QuickTime movies into 640-x-480-dpi, 60-fps videotape. But because VideoShop does not support subpixel interpolation, some finished movies don't play smoothly. Applications, such as Premiere and CoSA's After Effects, that support subpixel interpolation produce higher-quality movies, because they break each pixel down into tiny pieces, allowing much more accurate blends, colors, and movement.

VideoShop's Logging window lets you catalog and select clips from a videotape for batch digitization — in the order and with the effects you denote — into a VideoShop QuickTime file. Although the scripts in the Logging window are now analogous to EDLs (Edit Decision Lists), VideoShop's Logging scripts support only VISCA (Video System Control Architecture) devices and Sony serial-protocol devices. You can't create EDLs that would let you use professional video-production systems such as those from Grass Valley Group or even those from Avid.

VideoShop's documentation is fairly comprehensive. The user guide appears to cover all of VideoShop's features, but some of the feature explanations are incomplete. The slim tutorial is also unnecessarily vague, and its explanations are not always clear. Avid's technical support, however, is superb — we spoke to a real person and received thorough answers to every one of our questions.

The Bottom Line

VideoShop could truly be great if the company solved some interface problems, making it not only more responsive but also more intuitive. There are some problems with inconsistent performance, and the program could be more robust. Still, if you're only dabbling in QuickTime movie-making, using short clips and few transitions, and you don't foresee a need for commercial-quality video, VideoShop 3.0 is a cost-effective alternative to Adobe's Premiere or CoSA's After Effects. / Blake Roberts

VideoShop 3.0

Rating: ★★★½

Price: $395 (list).

Pros: Powerful tools for the price.
Large selection of filters.

Cons: Slow on-screen response.
Crashes with some transitions.
Can't create high-quality video.

Company: Avid Technology, Tewksbury, MA; 800-949-2843 or 508-640-6789.

Reader Service: Circle #413.

Seiko Professional ColorPoint 2 PSF Model 14 / Thermal-wax/dye-sub printer.

SWITCH-HITTER is the perfect moniker for the new Seiko Professional ColorPoint 2 PSF Model 14, a printer that can print full bleeds on tabloid-sized paper and is able to switch between thermal-wax-transfer and dye-sublimation printing technologies. The ColorPoint is designed to let you use less expensive thermal-wax media for intermediate proofs and then switch to more expensive dye-sub media for higher-quality final prints. Although it's not the first such dual-technology device, the big news with the $16,499 Seiko is that it can deliver quality that's good enough for graphics pros.

The Seiko Professional ColorPoint 2 PSF Model 14 is a 300-dpi printer with a built-in RISC-based Adobe PostScript Level 2 interpreter. It has all the features associated with high-end network-savvy color printers, including a full range of network connectivity options with automatic port switching and media sensing, so it knows whether a four-color or three-color ribbon is loaded.

Setting up the printer is straightforward. The printer driver is a modified version of the LaserWriter 8.1.1 driver that's easy to install and configure. The removable ribbon-carrier tray, for either dye-sub or thermal-wax ribbons, is easy to load, and the hubs on the ribbon rollers are made so it's virtually impossible to load the rollers the wrong way. The paper tray automatically senses which type of paper is loaded, and the printer returns an error message if the ink ribbon and the paper are mismatched.

The final setup step is to make the physical connection to the Mac. The printer comes standard with LocalTalk and Centronics parallel ports, but anyone printing tabloid-sized color pages will almost certainly want the speed provided by one or both of the printer's Ethernet options — EtherTalk and TCP/IP are available for $699 each or $999 for both.

Printing to the ColorPoint works exactly like printing to any other PostScript printer does, except that you can choose among several color-rendering modes. However, a potential Achilles' heel of the dual-technology design, particularly on busy networks, is that the printer doesn't let network users know which type of media is loaded. That means if you want a dye-sub print but your coworker loads thermal-wax media without telling you, you'll find out only when you go to collect your print job. If the reverse happens — you opt for thermal-wax output but your coworker loads dye-sub media — it's a more expensive mistake.

The ColorPoint's PostScript interpreter, based on a 33-MHz Intel 80960CA RISC processor, is quite speedy. The printer handled our one-page test document, composed primarily of text and vector graphics, in less than five minutes. But although the ColorPoint has one of the fastest engines on the market for printing on tabloid-sized paper, its speed for printing scanned photographic images is another story.

The printer ships with 24 MB of RAM

and an internal 160-MB hard drive, which serves as a memory-overflow buffer. In our tests, this configuration produced agonizingly slow print times with image-heavy pages. Our worst-case scenario — printing a tabloid-sized, 300-dpi, 50-MB Photoshop document — required more than an hour. Moreover, unlike other dye-sub printers for tabloid-sized output, the ColorPoint lacks a Photoshop Export filter, which speeds printing by bypassing the PostScript interpreter and sending image data directly to the printer.

That said, for reasonable speed when printing tabloid-sized pages containing scanned images, we recommend adding at least 64 MB of RAM, for a total of 88 MB. But you pay dearly for the extra RAM — a 64-MB expansion kit from Seiko costs $5,995. All in all, configuring the printer with Ethernet and 88 MB of RAM brings the price to a hefty $23,193, putting the ColorPoint in the same price bracket as the 3M Rainbow — the state of the art in dye-sub proofing devices.

The thermal-wax-output quality is excellent. The dye-sub output is also very good, but it has noticeably less shadow detail than output from competing dye-sub printers from Tektronix and Radius for tabloid-sized printing. In addition, ColorPoint output suffers from a slight magenta cast in light neutral areas, even when you use the EfiColor color-management system with the EfiColor profile for the printer. Given more time to experiment, we should have been able to improve the accuracy of our color matches, but be prepared for some trial and error. As a proofing printer, the ColorPoint also lacks one important feature set: the ability to show overprinting and traps and the related ability to print five-file EPS DCS files from full-resolution data.

The Bottom Line

By combining dye-sub and thermal-wax-transfer printing technologies, the Seiko Professional ColorPoint 2 PSF Model 14 occupies a unique niche in the world of professional-level desktop color-proofing systems. However, it's difficult to see the advantage of the Seiko Professional ColorPoint when you consider that when it's fully configured for heavy-duty tabloid work, the Seiko printer will cost you as much as two printers — one dye-sub and one thermal-wax. At its less expensive base configuration, the ColorPoint may be a good fit if your primary need is for a thermal-wax printer and you require only occasional dye-sub output. But if you're looking for a dye-sub printer that is able to print on tabloid-sized paper and you're planning to use it for either digital photography or prepress, you should most likely look elsewhere. / Bruce Fraser

Seiko Professional ColorPoint 2 PSF Model 14

Rating:

Price: $16,499 (list).

Pros: Easy to set up and use.

Cons: Costly extra RAM and high-speed network interfaces required for prepress applications.

Company: Seiko Instruments USA, San Jose, CA; 408-922-5800.

Reader Service: Circle #414.

Coda Vivace Personal Accompanist / Mac maestro and music coach

UNTIL NOW, IF YOU wanted to rehearse an orchestral piece, you had to either use recorded music, which doesn't make allowances for tempo changes or creative improvisation, or do without accompaniment altogether. Since you can't hire an entire symphony orchestra to practice with you, Coda Music Technology has put one in its outstanding intelligent autoaccompaniment system, Vivace.

Unlike accompaniment software such as PG Music's Band-in-a-Box, which forces you to play with the accompaniment rather than lead it, Vivace actually "listens" to what you play and adjusts the tempo of the accompanying music accordingly.

Following the Leader. You install the Vivace software on your Mac, connect a cable between one of the Mac's serial ports and the serial port on the back of the Vivace box, attach speakers or headphones to the box to hear Vivace's accompaniment, and clip the included microphone to your brass or woodwind instrument. Slide one of the Vivace music cartridges into the box, and as soon as you start playing, Vivace starts playing with you. As you change tempo, Vivace does too.

The Vivace box contains a 32-voice synthesizer, based on E-mu Systems' Proteus modules, that accompanies you with full orchestral, continuo, piano, or jazz-trio arrangements. You're limited to the musical pieces available on the Vivace cartridges, which cost $30 to $80 each and contain a single piece or a few dozen, depending on the music's density and length.



Vivace can also play great jazz accompaniments to the Jamey Aebersold jazz-improvisation library. But when in Jazz mode, the system works like any other music-minus-one system — it does not support intelligent tempo changes.

Vivace currently supports over 1,100 solo accompaniments for brass and wind instruments. In Coda's current catalog, the classical selections are particularly strong and range from Baroque to contemporary. The selections include everything from pieces easy enough for junior-high-school musicians to compositions that will challenge professionals.

Digital Maestro. In the Vivace package, you also get a software strobe tuner that works both visually and aurally; an on-line dictionary of musical terms; and features that let you add and subtract instruments from the jazz-band accompaniment, transpose a piece while a tune is playing, and loop particular sections of a piece so you can practice difficult passages.

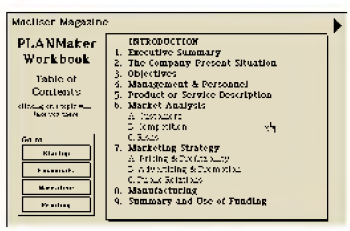
An incredible tool for beginning and advanced musicians, Vivace is an ideal addition to school music programs. It should be in every music classroom, from junior high to college. / Christopher Breen

Coda Vivace Personal Accompanist ★★★★★ / **Price:** $2,295 (list). **Company:** Coda Music Technology, Eden Prairie, MN; 612-937-9611. **Reader Service:** Circle #415.

PLANMaker / Business-plan writing

ENTREPRENEURS WHO NEED help getting a business plan together will probably find PLANMaker useful, especially if they lack formal business training. But more-sophisticated businesspeople looking for help beyond a first draft will be disappointed with the program's limitations.

PLANMaker is a collection of HyperCard stacks designed to teach you how to write a business plan. The best part of the program is that it imposes structure on a potentially tedious, open-ended task, breaking it down into steps by asking you thought-provoking strategic and financial questions. PLANMaker turns your responses into four linked, calculated financial statements and categorized text that you can use for drafting your business plan.



Although this structure is helpful, it also gives you some less-than-helpful inflexibility. You can't extend your projections beyond three years, include more than 11 marketing-expense accounts, or apply a depreciation method other than straight-line.

Sampled Abstruseness. PLANMaker has three sample plans from which you can copy text and paste it into your plan. But the samples struck us as far from models of good writing. For example, a sample plan for a restaurant has the following passage referring to competition from other food vendors at an outdoor festival: "It is easy to observe that these are among the most popular stops with celebrants, often people congregate 3 and 4 deep around the stands clamoring for service, as the delectable smoke and fragrance waft into the surrounding air." Excessive reliance on only these examples could also rob your plan of distinctiveness.

POWERSolutions claims that PLANMaker requires no additional software, but the program's bare-bones word processor can't check spelling, much less create attractive layouts. Moreover, you can't adjust column widths in financial tables or export financial-statement data into more-powerful spreadsheet programs. And PLANMaker has no charting capability.

Terminologically Challenged. The documentation's clumsy writing; disorganized design; and abundant errors, misspellings, and redundancies make reading it arduous. Even standard accounting terminology challenges the writers, who call a 12-month projected-income statement a "proforma." For $100, users have a right to expect documentation better than a bad first draft.

Whether or not you should buy PLANMaker depends on how quickly you want to produce a first draft of a business plan. If you consider the completion of a first draft to be the most difficult phase of business-plan preparation and if you're willing to sacrifice flexibility, PLANMaker may be useful. But for those who view their first draft as a document to be refined, PLANMaker's poorly implemented features and its rigidity outweigh its ability to turn an ostensibly overwhelming project into a feasible one. / Doug Dominic

PLANMaker 1.1 ★★½ / **Price:** $129 (list). **Company:** POWERSolutions for Business, St. Louis, MO; 800-955-3337 or 314-421-0620. **Reader Service:** Circle #416.



Scenery Animator / And on the seventh day . . .

SLIGHTLY EASIER to use than Vistapro (see Quick Clicks, October '94, page 63) but lacking the realistic scenery of KPT Bryce, Scenery Animator is an acceptable, but not outstanding, tool for creating virtual landscapes.

To create 3-D terrains, you use U.S. Geological Survey Digital Elevation Mapping (DEM) data, gray-scale PICT files in which the brightest parts are the highest, or the built-in fractal generator. You then add oaks, redwoods, clouds, and water to your scene. You can also specify tree- and snow-altitude lines for your world. But the program restricts you to choosing from existing elements; Scenery Animator has little in the way of useful or creative customization tools. As a result, the trees look unnaturally similar and rendered water looks unusably unrealistic. Scenery Animator has some great sample terrains, and you can render your scene at three levels of detail or export it as a DXF file for rendering in another 3-D program.

Flyby Viewing. You can create still images as well as animated flying sequences you save as QuickTime movies. Setting up keyframes for your animation is easy, especially compared to doing so in Vistapro, and Scenery Animator does a good job of creating in-between frames, complete with camera moves such as autobanking. The program also has good camera-positioning controls. And for speed mavens who have Power Macs, the package includes a native Power Mac version. / David Biedny

Scenery Animator 1.1.2 ♜♜♜ / **Price:** $149 (list). **Company:** Natural Graphics, Rocklin, CA; 916-624-1436. **Reader Service:** Circle #417.

PowerAGENT / Apple events for the rest of us

IF YOU WANT TO harness the power of AppleScript and Apple events to automate tasks on your Mac but don't have the time to delve into scripting, consider PowerAGENT. This application/extension combination lets you set up "jobs" composed of a trigger (a specific time, for example) and a task (bringing up a reminder to make a phone call, perhaps).

FileMaker Fireworks. PowerAGENT adds an exciting new dimension to FileMaker Pro in particular, because of that program's Apple-events capabilities. For example, PowerAGENT can monitor an inventory database every day and notify the purchasing department by e-mail when inventory falls below a designated level. You simply choose triggers and tasks by clicking on buttons — this process and many others require no knowledge of AppleScript.

Once you move away from database programs, some scenarios do require scripting skills. We also found that the initial release had a few quirks, mostly related to a conflict with the Reminder control panel in Now Up-to-Date. When Up-to-Date's Reminder control panel was active, PowerAGENT wouldn't run scheduled jobs. Other minor quirks and bugs included the program's occasional habit of making customized job names revert to their default names.

PowerAGENT is an example of Apple's hottest technology at its best. Once its bugs have been fixed, we hope to see this utility mature and prosper. / Gregory Wasson

PowerAGENT 1.1 ♜♜♜ / **Price:** $159 (list). **Company:** SouthBeach Software, Coconut Grove, FL; 305-858-8416. **Reader Service:** Circle #418.

Virex Administrator / Keeping networks virus-free

DATAWATCH'S NEW Virex Administrator makes it easier than ever for network administrators to secure a virus-free network. Used in conjunction with Datawatch's speedy antivirus utility, Virex, Virex Administrator initiates scans and repairs on clients simultaneously from one central remote terminal rather than individually on each local machine.

Remote Administration. Included in the Virex Administrator package are TechWorks' GraceLAN Responder and GraceLAN Messenger, which serve as the communications channel between the administrator and the client machines. Once these two programs have been installed on each client machine, a network administrator can accomplish a myriad of tasks from a remote location. For example, a network administrator is able to remotely install Virex, send update packages and messages, and reboot clients to ensure that new resources are loaded into memory.



Before Virex Administrator can initiate any scans, you will have to add each client to a user list. Each of these lists automatically provides general information about the users included on it, such as network zone and result of last action taken. Any infected computers — as well as those machines whose scans were canceled before completion — are highlighted on the list. Virex Administrator uses the list to generate a detailed report that it then saves as a text file.

Quick and Convenient. Of course, network virus scans and repairs can cause major disruption to users' work, but Virex Administrator avoids this problem in several ways: First, Datawatch's SpeedScan technology is lightning-fast. When we tested Virex Administrator on Macintoshes ranging from an LC to a Power Mac 7100, the average time for a volume scan was 10 to 25 seconds. Using the shareware program Disinfectant 3.5., the same scan took 2 to 4 minutes.

Second, a network administrator has the capability to allow users to postpone scans until off-peak hours or to cancel a remotely instigated scan altogether. And finally, the administrator can keep Virex running in the background while local applications are being installed.

Despite all its virtues, Virex Administrator is not without its faults. Here's an example: A network scan can be delayed in increments of hours and minutes, but it cannot be scheduled by indicating a specific time. This means that you are able to schedule a scan in, let's say, 2 hours, 40 minutes but not at 5 P.M. As new viruses make an appearance, Datawatch will post the search strings on various on-line services, but you will be expected to fork out $75 a year for this service.

These shortcomings aside, Virex Administrator's speed and ease of use make the program a tool no network administrator should be without. / Alan M. Chan

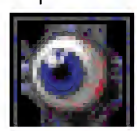
Virex Administrator 1.0 ★★★½ / **Price:** Virex Administrator with 25-user license, $200; Virex with 25-user license, $950; Virex, $99.95 (list). **Company:** Datawatch, Triangle Software Division, Research Triangle Park, NC; 919-549-0711. **Reader Service:** Circle #419.

Troubled Souls / Gothic twists

TETRIS FANS have had their share of knockoffs, but nothing comes close to the invention and beauty of Troubled Souls.

As in Tetris, the goal is to arrange descending segments into whole units. Unlike the horizontal/vertical approach Tetris takes, however, Tortured Souls is all circles and loops. You put together closed loops with the quarter-circles, bars, and crosses you get; the more twisted they are, the more points you earn.

Crossed Bones. Segments plunge down into a tube, and you place them by clicking on the playing field. As you create a closed loop with the pieces, it disappears. At first you get generic pieces for easy-to-figure circular combinations, but then things get more engaging and bizarre as intricately depicted body parts start falling down the chute as well. Eyes and ears and hands and skulls don't mix: Only like (and generic) parts can come together to form closed objects. As putting together loops becomes harder, you run out of field space and the tube starts filling up with pieces that have no place to go. When the tube overflows with parts, you lose one of your three lives. When you lose your last life, the game ends.



What makes Troubled Souls unique is its darkly gothic look, its moody musical score, and its icy sound effects. The only trouble with it is that it's highly addictive — just try not to keep playing when it's time to get back to work. / Joe Hutsko

Troubled Souls ★★★★½ / **Price:** $49.95 (list). **Company:** Varcon Systems, San Diego, CA; 800-266-6700 or 619-563-6700. **Reader Service:** Circle #420.

Menu Master Mac Lite / Secure your files and folders

IF YOU LIKE WHAT At Ease does — limit users' access to certain files and applications through the Finder — but don't like the way it changes the entire look of the desktop, or if you wish it would work under System 6, you may want to consider Menu Master Mac Lite.

When users view a Mac running Menu Master Mac Lite, the Finder seems basically unchanged. It's only when they pull down a menu or open a folder that they see they have access only to selected Apple-menu items, programs, and files. They can shut down and restart the Mac and, using the Personal File Utilities dialog box, create new folders and copy, delete, and rename files in a personal folder on the Mac or on a floppy disk.

Hide and Secure. As the administrator, you can use Menu Master Mac Lite to password-protect menus and files, make them read- or write-only, or hide them altogether.

Administering Menu Master Mac Lite can be awkward at times, in no small part due to the confusing manual, which calls the program's windows menus. And unlike its more expensive parent, Menu Master Mac, the program can't log printer or computer use or do automatic log-offs. But for those who don't need a lot of features, Menu Master Mac Lite delivers as promised. / Jeffrey Sullivan

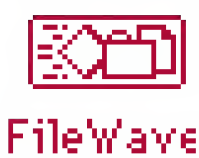
Menu Master Mac Lite 2.1 ★★★ / **Price:** Single-user version, $49; site license, $299 (list). **Company:** Electronic Learning Systems, Gainesville, FL; 800-443-7971 or 904-375-0558. **Reader Service:** Circle #421.

FileWave / Painless software distribution for networks

IF YOU'RE A NETWORK MANAGER, making sure everyone has the latest versions of software as well as all the software they need can be one of your most challenging responsibilities. Users often forget to use the network installers you've set up on your server. Also, most software-distribution utilities send out huge packets of software that slow your network and your users' Macs. Moreover, you can't update Macs that are turned off or removed from the network. FileWave not only automates software distribution but also gets around these problems ingeniously.

FileWave has three components: the user software for each network client, the server software, and an administration tool. The server software turns your server into a "repository" that distributes files automatically throughout your network. You can use the administration tool to control the content of the repository from any Mac on the network.

Bit by Bit. Unlike other software-distribution tools that copy files to networked Macs en masse, FileWave trickles little pieces of a file to each client over time, resulting in negligible network slowdown. Furthermore, FileWave doesn't start updating a Mac until the machine is idle. The updating stops, even in midtrickle, if the computer is being used or is shut off, and resumes, right where it left off, when the computer is on and idle again. The user software keeps track of the trickling process, ensuring that each user receives complete files, no matter how long it takes.



Following the well-written documentation, installing both the user and the server software takes only a few minutes per machine. The installer places a system extension and an application into the System Folder on each Mac; however, it puts the application into the Control Panels folder, although we thought it would be more appropriate under the Apple menu, if anywhere.

Once a Mac has the FileWave user software installed, an additional volume called FileWave appears on its desktop. This volume is a generic delivery destination in which the repository deposits files. You can also configure distribution so that the repository delivers files to a specific destination, such as the Extensions folder.

Wave Research has a novel approach to administration. You control users, groups, applications, and all software from a Finder-like environment. At first glance, we found this approach appealing, but in use, we discovered that having to open multiple folders just to get to a file made it difficult to get a quick overview of the system. We would prefer to use a dedicated administration interface that shows user and repository information in a single dialog box.

FileWave makes software baseline management an easy task for network administrators and painless for users. For those who need centralized software management and distribution, FileWave is the best of the bunch. / Blake Roberts

FileWave 2.0 ★★★★ / **Price:** 20-user starter kit, $895; 10-user add-on, $395; 50-user add-on, $1,795 (list). **Company:** Wave Research, Berkeley, CA; 510-704-3900. **Reader Service:** Circle #422.

Demo versions and QuickTime movies of selected programs mentioned here are available in the MacUser and ZiffNet/Mac areas on CompuServe and eWorld. See page 4 for instructions regarding on-line access.



Here Come the CLONES

IMAGINE YOURSELF TWO YEARS from now, wandering the aisles of a 1997 Mac trade show. Right away, you notice that it's bigger and busier than ever, and when you look closely, you note some crucial differences from the expos of old: The second-biggest booth in the hall belongs to IBM, and it's packed with high-powered machines stamped with the Big Blue logo — some running OS/2, some running AIX, but most running the latest release of Mac OS.

Over in the Apple pavilion, the marketeers are staging a shootout between a Power Mac 9900 and some hot new Intel box — each running Windows NT. Then they reboot the Mac in preparation for the next demo, and this time, it comes up under Sun's Solaris operating system or suddenly becomes a NetWare server.

Around the show floor, you see hardware companies you've previously encountered only in PC magazines. In a big booth in the center of the hall, someone's showing a dual-processor graphics workstation that costs $10,000 and a fault-tolerant server that goes for $15,000; off in the distant fringes, you run across a company from Taiwan that's selling bare-bones desktop boxes for $500 and subnotebook computers for $850. And large or small, the vendors are clamoring to show you how well their systems can run your Mac software — unless, of course, you'd rather run something else.

A far-fetched fantasy? Six months ago, it certainly would have seemed so; today, it appears that something close to that scenario may come true, if Apple, IBM, and Motorola have their way.

In a historic announcement on November 7, 1994, the three PowerPC partners began a new stage in their relationship. After three years of working together to design and promote their new RISC processor, they agreed on a common hardware platform — a specification all three will support as they design future PowerPC computers. And they proclaimed it an open standard, one other

PHOTOGRAPHY / DIANE DEMPSEY



Apple, IBM, and Motorola

the deal of the decade?

HERE'S WHAT THE AGREEMENT between the three PowerPC partners spells out:

- **A shared hardware design.** Apple, IBM, and Motorola agree on a common minimum hardware platform for future PowerPC computers. Other manufacturers will be free to build their own systems based on the standard. Machines based on the standard will begin reaching users sometime in 1996.
- **OS options.** Apple will adapt Mac OS to run on the new platform, and IBM will do likewise with OS/2 and AIX. Motorola will take responsibility for porting Windows NT; Sun will deliver Solaris, its UNIX implementation; and Novell will port NetWare for PowerPC (to be released this summer) to the new platform. Each of these operating systems should run on any machine that complies with the new hardware, regardless of manufacturer.
- **Open licensing of Mac OS.** Apple promises to license Mac OS, including ROM code, to any manufacturer building computers based on the new spec.
- **Compatibility.** All software and peripherals that work with Power Macs or with IBM's original PowerPC Reference Platform (PReP) systems should work on machines designed to the new standard.
- **Short-term plans.** Apple will proceed with plans to release second-generation Power Macs, including PowerBooks and desktop systems with PCI buses, this summer. It will also move ahead with plans to license these hardware designs, along with Mac OS software and ROMs, to a limited number of other manufacturers. Meanwhile, IBM is expected to deliver systems based on PReP this spring; operating-system options will include AIX, OS/2, and Windows NT.

Apple, IBM, and Motorola intend to define a new kind of PC that will run Mac OS, OS/2, and Windows NT. The implications are profound — for the industry and for Mac users.

By Henry Norr

manufacturers will be free to copy in designing their own systems.

Because all machines built with the new architecture will rest on common hardware foundations, an operating system that runs on any of them will run on all of them. Specifically, Mac OS, after some relatively modest changes, will run on the new platform, and Apple, in a dramatic break from its traditions, has agreed to license its operating system to any other company that's building hardware that complies with the new spec. In short, any other company will soon be able to build Mac-compatible hardware and license Mac OS to run on it.

While Apple adapts its system software to the new standard, IBM will do likewise with its two PowerPC operating systems, AIX (its version of UNIX) and OS/2. Motorola, which was already working with IBM and Microsoft to bring Windows NT to PowerPC machines, will make Windows NT run on the common hardware platform. And two other companies have already thrown their hats into the same ring: Sun Microsystems has said that it will port Solaris, the UNIX implementation it offers on its SPARC workstations, and Novell has promised a version of Processor-Independent NetWare, the portable version of its market-leading network operating system.

For most of the companies involved, the new standard represents only a tactical maneuver; for Apple, it's a wrenching, although not entirely unexpected, change in strategic direction. Since its founding in 1977, the company has kept most of its technology to itself. For more than ten years, it resisted pleas from customers, analysts, and some of its own officers that it license other manufacturers to build Macs.

All that's over now. The age of clones is upon us.

Hold Your Horses

It will take a while, though, before the versatile new machines hit dealers' shelves. The new spec — so far known only as the common hardware reference platform — won't be final until later in the first quarter of this year. Developers have been told that they should be

Building a Clone / *custom Macs for custom needs*

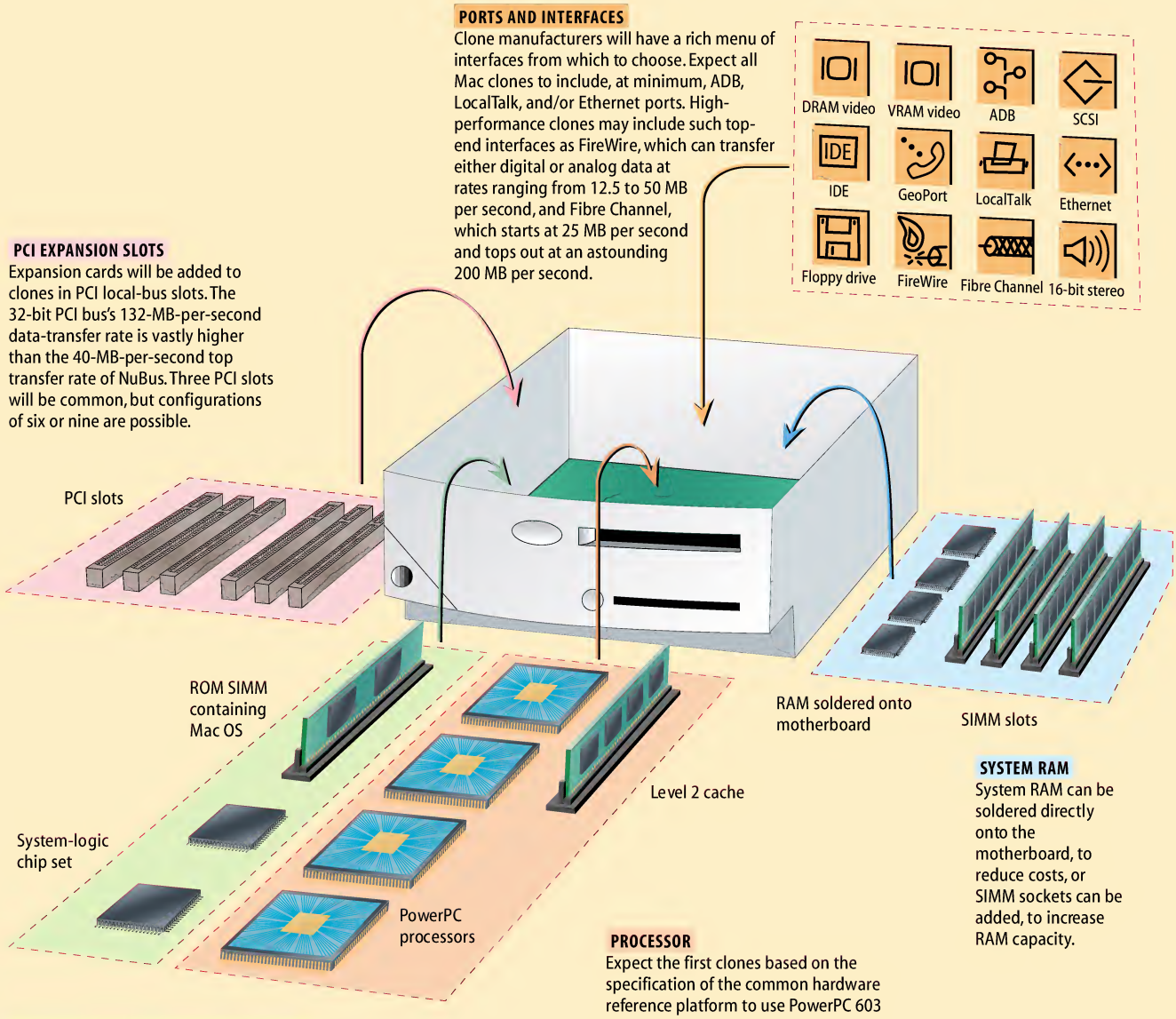
THERE'S STRENGTH IN BOTH UNITY AND DIVERSITY — and the specification for the common hardware reference platform will encourage both.

It will promote unity by creating an open standard that enables system manufacturers to design desktop computers that can run a variety of popular operating systems.

It will promote diversity by confining the essential elements of the standard to core considerations such as the flow of data between the CPU and RAM. More-mundane considerations, such as the number and type of ports, slots, caches, and storage, will be left to the discretion of individual manufacturers.

Although Apple will almost certainly say that the vendors to whom it licenses Mac OS will adhere to certain minimum hardware capabilities, the growing variety of components points to a diverse future.

This illustration shows the range of options available to clone vendors. If they mix and match components, they can meet a vast range of user needs. For example, one vendor might pair a PowerPC processor with a few megabytes of onboard RAM and add only the most basic ports, thus producing an education Mac for well under $1,000. Another might combine multiple processors with the latest in high-speed data-transfer technology and find graphics and DTP buyers eager to pay five figures.



able to get prototypes of the hardware in the third quarter of 1995, but the systems probably won't actually ship to customers until sometime in the second half of 1996.

In the meantime, the partners will proceed with other hardware they've already been working on. Later this year, Apple is expected to deliver a slew of new Power Macs, including PowerBooks that incorporate the low-power-consumption PowerPC 603+ chip and desktop systems built around a fast industry-standard expansion bus known as PCI (Peripheral Component Interconnect) in place of NuBus. These machines, which have been under development for several years, will not comply with the new spec, but they will in effect represent a transitional stage, because PCI is also one of the core features of the common platform.

Under agreements Apple negotiated before arriving at the common hardware standard with IBM and Motorola, Apple will allow a few companies to copy its first-generation PCI-based designs and ship a version of System 7.5; unless plans change, these earliest Mac clones may be released by the fall of this year. But these systems are not expected to have a major impact on the computer marketplace, at least in the U.S. Apple's primary goal in negotiating them, officials said, was to find partners to market the Mac in areas where the company itself has had relatively little success, such as German business and Japanese education. According to Apple, six major manufacturers have agreed to participate in this limited licensing program, but it declined to name them. [*At press time, Bandai, a Japanese manufacturer, announced that it had reached an agreement with Apple to produce a RISC-based machine based on Mac OS and designed for children. — Ed.*]

Meanwhile, IBM is expected to deliver its long delayed Power Personal systems — its first PowerPC models for the mainstream business market — this spring. Those machines, running either AIX, Windows NT, or a new microkernel-based version of OS/2, are based on the PowerPC Reference Platform (PReP), a proposed hardware standard that was introduced by IBM in 1993 but never accepted by Apple.

Share and Share Alike

Until the new spec is complete, Apple, IBM, and Motorola are refusing to disclose details about the common platform. But some features are known: In addition to a PowerPC processor and a PCI bus, it will have SCSI, an enhanced version of the PC-standard parallel printer port, and both Apple Desktop Bus and PC-style mouse and keyboard connectors. The standard makes provisions for Mac ROMs as well as an IBM ROM BIOS (basic input/output system) as well as low-level hardware registers the two companies' systems require. System startup and configuration of PCI cards will be managed by OS-neutral code based on a new industry standard called Open Firmware.

The partners said that they hope to "achieve 100-percent compatibility with current PowerPC-based hardware and software application products" by incorporating technology from both Apple and IBM. The formal announcement leaves a little wiggle room; it says, "the vast *majority* of applications written to *current* specifications will run *largely* unmodified" (emphases added). But Apple sources said that they did not expect significant compatibility problems.

Officials said that they expect most customers to run only one operating system, which they'll specify when ordering the equipment. But users who require more than one OS will be able to keep additional systems on-disk and select the one they want at boot time. For the foreseeable future, you'll have to restart the machine to change operating environments, but IBM officials said that they are exploring some technologies that may eventually allow true dynamic switching.

Just as with previous Macs, you'll need Mac ROMs as well as the system software to run Mac OS. According to Jim Gable, manager of Apple's Power Mac product line, the common-platform standard requires a socket for the Mac ROMs, but system makers may leave it empty when shipping a machine configured for another OS; customers who later wish to run Mac software will need to order the ROMs from their system supplier.

Support for the new standard will be rolled into the system-software release code-named Copland, which is due late in 1995, according to current plans (although many developers say that it's likely to slip into 1996). In light of the hardware changes required under the agreement, Apple will have to produce some new drivers as well as modify some of its ASICs (application-specific integrated circuits), but Gable said that those tasks will not substantially delay the release.

Compatibility

but will they do Windows?

WILL MACS AND OTHER MACHINES based on the common hardware platform run DOS and Windows 3.1 or Windows 95? Not directly, but users of common-platform machines who need to run PC software shouldn't have much trouble finding a solution.

Software emulators, such as Insignia Solutions' SoftWindows for the current Power Macs, should continue to work on the new hardware. The other desktop operating systems expected for the common platform — OS/2, AIX, Windows NT, and Solaris — also support applications that run under DOS and the current, 16-bit version of Windows through emulation.

New 32-bit applications designed to take advantage of Windows 95 will also run under Windows NT. (Microsoft requires developers to test their code on Windows NT before it will authorize use of the Windows 95 logo.) Once an application is running under Windows NT for Intel-chip systems, porting it to other versions of Windows NT, including the PowerPC common-platform version, should require little more than recompilation. Since most PC developers are expected to support Windows 95, it's likely that nearly all major new Windows applications will be available in native form under Windows NT for the new platform.

PCI, the bus that's the backbone of the new platform, will provide a fast and standard interface for add-on cards with x86 processors. Apple is rumored to be planning a PCI version of the DOS Compatibility Card it currently offers for the Power Mac 6100, and other vendors are developing competing cards with additional features.

In addition to support for the new standard, Copland will include more native PowerPC code, a new networking architecture and file system, OpenDoc, and some significant interface enhancements.

What It Means for You

The most obvious impact of clones on the people who currently use Macs is that their choices of computer hardware will no longer be limited to what Apple offers. That's because IBM and probably dozens of other manufacturers will be offering machines capable of running Mac OS and Mac applications. That should mean a wider range of options in terms of price, performance, features, and style. Look for dirt-cheap entry-level systems, high-priced workstations capable of running Mac software at previously unheard-of speeds, and a variety of specialized systems targeted at vertical markets.

The benefits don't stop with more hardware, though. Because the new design relies more on industry-standard components than current Macs do, Apple's cost of goods should decline, and increased competition will likely force the company to share the savings with its customers. Until now, Apple has been subject to price pressure only indirectly, through competition from PC vendors; starting in 1996, even Mac loyalists will have other choices, and Apple will have to adapt to the same kind of brutal market discipline that governs the PC world.

In addition to affecting prices, the existence of alternatives may force Apple to improve in other areas — longer warranties, for example, and better phone support. Customers fed up with hour-long waits at 800-SOS-APPL may try another vendor the next time.

Application Benefits

If you need an application that's not available for Mac OS but that runs under one of the five other operating systems so far announced for the new platform, you should have no trouble running it on your

OS Options / *what operating system will run on the new machines*

Mac OS

For current Mac users, the choice should be easy: The 1996 hardware will run Mac OS and, according to Apple, any applications that run on 1994 and 1995 Power Macs. The machines are likely to ship initially with the version of the operating system Apple code-named Copland, which is slated to include the OpenDoc component-software architecture, a new networking architecture called Open Transport, a much improved file system, and a host of interface improvements. Based on an Apple-developed microkernel, Copland will mark a major step in the process of giving the Mac a modern, industrial-strength operating system — a process that should be completed the following year, when another major upgrade, code-named Gershwin, is due.

OS/2 for the PowerPC

The PowerPC version of IBM's OS/2, scheduled to first ship this spring on Big Blue's PReP machines, will be based on an advanced architecture IBM calls Workplace OS. IBM's management has said repeatedly that it considers OS/2 a "strategic" operating system, and the company is investing heavily in the technology. OS/2 is also the foundation of the company's work on "human centered" technologies, such as voice recognition and synthesis, handwriting recognition, and intelligent agents.

Although the selection of off-the-shelf software for OS/2 on Intel-chip machines is sparse, OS/2 runs 16-bit DOS and Windows applications (and, through emulation, will continue to do so on the new platform).

AIX

Under the original 1991 Apple/IBM agreements, the two companies were to have collaborated on development and marketing a new version of AIX for the PowerPC, which would have been the basis for the PowerOpen standard; Apple was to provide software, which was later dubbed Macintosh Application Services (MAS), that would let UNIX users run the Finder and Mac applications. A PowerPC version of AIX, version 4.1, has been shipping since last summer, but it won't run on Power *Macs* until sometime this spring.

An estimated 9,000 applications, most of them scientific or technical, have been written for AIX, and they should all run on the common hardware platform.

Windows NT

Windows NT shares its name and GUI but little else with Windows 3.1. It's a portable, 32-bit operating system available not only for Intel's 486 and Pentium chips but also for the Digital Alpha and MIPS RISC processors. Because of its high-end features such as built-in networking, multiprocessor support, and extensive security, some consider it a rival to UNIX. Windows NT sales so far have been modest, mostly for server rather than desktop applications. But the latest upgrade, version 3.5, has been well received, and the impending release of Windows 95 is likely, paradoxically, to give Windows NT more mass appeal by increasing the software selection — applications rewritten for Windows 95 will also work on NT. And once a program is running under Windows NT with an Intel processor, developers will need only to recompile their code for a RISC processor.

By this roundabout route, applications previously available only for x86 systems or via emulation for RISC systems will become available under Windows NT for the common platform running in *full-speed native PowerPC mode*. That could be a big advantage for Windows NT, since these packages will run only in emulation under the other operating systems for the new hardware.

Solaris

Scott McNealy, Sun Microsystems' outspoken CEO, has long argued that only three processor architectures can survive as mainstream products, so it was a tribute to the PowerPC when he picked it (way back in 1993) to join Sun's own SPARC chips and the x86 family as the third platform for Solaris, his company's current UNIX version. The PowerPC common-platform version is expected to be compiled from the same code base as the upcoming version 2.5 for SPARC and Intel chips. As the dominant player in the workstation market, Sun boasts a huge base of software for financial, technical, and communications tasks.

Processor-Independent NetWare

Novell's NetWare has become the networking king of the Intel-chip PC world, but the company has been working for years on a processor-independent version of its network operating system. Originally, the primary target was Hewlett-Packard's Precision Architecture, but when HP dropped out of the project in 1993, Novell designated Apple's PowerPC Workgroup Servers as its new focus. When the common hardware platform was announced, Novell promptly promised to put its software there as well.

The success of NetWare for PowerPC, however, will not depend on Novell alone. Corporate managers value NetWare not only for its own sake but also because it supports a whole industry's worth of add-ons, known as NLMs (NetWare Loadable Modules). So far, though, few NLM developers have committed to porting their products to the PowerPC.

common-platform machine, once you've purchased and installed the required OS and rebooted your system under it. Most major commercial applications are likely to be offered in native PowerPC versions for one or more of these operating systems, although you'll still have to turn to PC-emulation software or a card (or OS/2 or Windows NT) to run vertical-market and in-house applications written for DOS or Windows 3.1.

At the same time, software developers who have abandoned or avoided the Macintosh thus far may now discover that it's time to take a second look. By itself, the existence of a common hardware platform won't be enough to change their minds; the key factors, as always, will be market share first and foremost, followed by confidence in the platform vendor's prospects and strategic vision, the quality of the development tools and developer support available, and the appeal of the underlying hardware and software environment. But if the agreement and Apple's licensing plan work as intended, market share for Mac OS should increase steadily after the new hardware appears, and that in turn should engender more confidence, better tools and support, and a continuing flow of innovative technology.

In the corporate market in particular, the common platform is sure to have more appeal than the proprietary Mac has had. That's likely to spur interest in supporting the platform on the part of developers offering enterprise-oriented products, such as client/server, work-flow, and network-management software. (The same goes for hardware such as high-speed networking products.) Of course, even developers who make a commitment to the new hardware platform won't necessarily deliver Mac OS client software; Windows NT will be the nearest port for developers already supporting Intel-chip-based client software. But *if* Mac OS becomes the dominant choice among users of common-platform machines, there will at least be strong pressure on enterprise developers to offer Mac OS support.

Mix and Match

Managers at sites that have a mix of computing environments will gain new flexibility in how they deploy their hardware. Common-platform machines will be ideal for training facilities and computer labs: If multiple operating systems are installed, a simple reboot will be able to convert a machine from a Mac to a Windows NT or OS/2 PC or to a UNIX workstation. If a Mac-oriented corporate graphics department moves up to a faster machine, the company will be able to reconfigure the old one to run another OS in another department. Educators who believe that students learn more when using the Mac but face pressure to prepare them for the Windows-dominated business world will no longer have to lock themselves in with inflexible hardware choices. Even people working out of home offices will be able to run vertical applications under OS/2 or Solaris by day and Mac software in the evening.

Again, the only real limitation is that unless you add a co-processor card to the machine, existing DOS and Windows 3.1 programs will work only in emulation on the common platform. But with the PC world finally beginning to move to 32-bit code that can easily be ported to the common platform, that problem is likely to be much less critical by the time the new machines arrive in 1996 than it is today.

Six Years

the long and winding road to clones

1991

JULY / Apple, IBM, and Motorola announce alliance, plans for PowerPC processor.

1992

SEPTEMBER / IBM delivers first working prototypes of PowerPC 601.

1993

SEPTEMBER / IBM ships PowerPC 601 workstations.
OCTOBER / IBM announces PowerPC Reference Platform (PReP), a proposed standard for PowerPC computers. Apple refuses to endorse it.

1994

JANUARY / Apple CEO Michael Spindler pledges to announce plans for licensing the Mac operating system within the year.
MARCH / Apple ships first Power Macs.
SEPTEMBER / Apple announces plans for limited licensing of Mac OS and Mac hardware designs in 1995 but names no licensees. IBM postpones release of its mainstream PowerPC machines.
NOVEMBER / Apple, IBM, and Motorola announce agreement on common hardware platform for Mac OS, OS/2, AIX, Windows NT, Solaris, and NetWare. Apple pledges open licensing of Mac OS.

1995

FIRST QUARTER / First Mac clones due, probably not in U.S. Developers slated to get prototype machines based on common hardware platform.
SPRING / Details of common hardware platform due. Release of IBM PReP machines expected, with choice of OS/2, AIX, or Windows NT.
SECOND HALF / Second-generation Power Macs due, including notebook computers with PowerPC 603+ and desktop machines with PCI bus and PowerPC 601 or 604 processor. Will run Mac OS only.
END OF YEAR / Copland (System 8) release of Mac OS due.

1996

MIDYEAR / Systems based on common hardware platform due from Apple, IBM, Motorola, and others. Customers will be able to run Mac OS (Copland), OS/2, AIX, Windows NT, Solaris, or NetWare.
END OF YEAR / Gershwin release of Mac OS planned.

Wait and See

Only time will tell how successful Apple, IBM, and Motorola will be in taking the common hardware reference platform from specification to actual machines to viable new market. By 1997, we ought to know whether the reality has lived up to the promise.

Henry Norr is editor emeritus of *MacWEEK*.

HOW TO BUY Your Perfect

The specifications, performance statistics, and key facts you need to know about today's Macintosh lineup. By Drew J. Cronk

THE UNCERTAINTY PRINCIPLE of quantum physics states that it is impossible to precisely know both the position and the velocity of a particle at the same instant. And so it is with the state of the Mac: At any given moment, it seems that it's impossible to recite the current lineup's specific attributes *and* compare speeds. The face of an authorized Apple dealer will turn pale if you ask for such help. At best, you'll walk away with a handful of inadequate cheat sheets containing only the "marketable" specifications for a select few Macs.

In this, our most extensive Mac comparison to date, we provide an exhaustive compendium of specifications, performance statistics, and tips and hints that will be worthy of your reference shelf for some time to come. For starters, we used a new and improved version of the Ziff-Davis Benchmark Operations' MacBench benchmarking utility to find the relative speeds of currently shipping Macs and some of the most popular Macs of yesteryear. Unlike most befuddling, acronym-filled benchmark utilities, MacBench gives simple, readable, usable results. We also rated each Mac on its suitability for various tasks and gave each an overall mouse rating.

Next, we tore the currently shipping Macs apart, breaking them into their main components: processor, memory, SCSI, video, and

PROCESSOR AND MEMORY *page 86*



SCSI AND STORAGE *page 88*



PHOTOGRAPHY / GIAMPIERO BENVENUTI

Macintosh

expansion slots. We tell you — and show you — what you need to know to work successfully with these components. You'll see easy-to-read tables that include key specifications for each of the components, and you'll find fistfuls of tricks and techniques that will make your life with a Mac a whole lot easier. You'll even find all that never-around-when-you-need-it information: tidbits such as how to read the arcane identification system stamped on a SIMM and how to deal with finicky SCSI devices.

Finally, if you're a newcomer to the family of Mac users and you want a crash course in Mac history, or if you're a Mac veteran who wants the most comprehensive collection of Mac specifications ever assembled, you can download the Mac Catalog Database from ZiffNet/Mac. This FileMaker Pro database contains a wealth of specifications on every Mac ever released (yes, even such flashes in the pan as the IIvx and the Mac TV). The Mac Catalog Database is available on eWorld at Shortcut:MACUSER, path:MacUser Software Library:MacUser Utilities/Ziffware. On CompuServe, type GO: MACUSER and search for DBMACS.SEA in Library 1. And while you're rummaging around in ZiffNet/Mac, you might also want to browse through its extensive collection of handy utilities, helpful applications, and way-cool entertainment software.

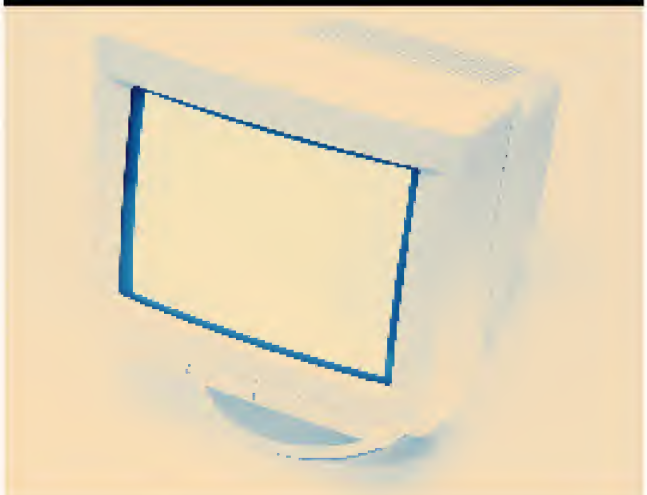
So now you're armed with all the facts you need to choose the perfect Mac — and help it lead a long and happy life. You don't have any more excuses; the information is here — now it's up to you to use it.

Drew J. Cronk swears that the only reason he wears that propeller cap is cuz his mom gave it to him for Christmas. (Mom concurs but adds that the Christmas he's referring to was over 30 years ago.) ZD Labs project leader Kristina De Nike managed the testing for this report, and Mark Simmons, product manager for ZiffNet/Mac, compiled the Mac specifications.

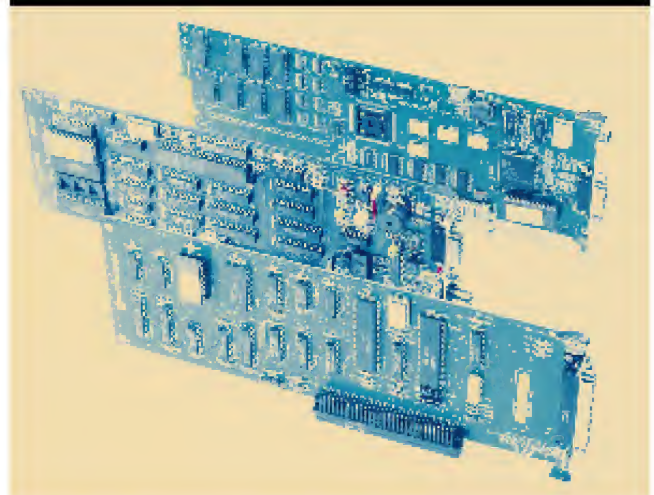


MacBench 2.0 is available on-line on ZiffNet/Mac. See page 4 for instructions on accessing ZiffNet/Mac.

BUILT-IN VIDEO *page 90*



EXPANSION SLOTS *page 92*



Speed Tests

Four fine-tuned MacBench tests tell you how fast the Mac's main components run.

BY HENRY BORTMAN

EVER WONDERED just how fast your Mac is? Or whether Power Macs are really worth the money? Or if that zippy new hard drive you've been reading about would do much for your Performa?

Well, we wondered about these things too. That's why, in December 1993, we unveiled MacBench 1.0, an application developed by Ziff-Davis Benchmark Operation (affectionately known as Zee-DeeBop) that measures the performance of Mac computer systems. Now the folks at ZDBOp have done it again. A warm welcome, please, for the new and improved MacBench — version 2.0.

Like its predecessor, this new version measures the performance of the Mac's four major subsystems. The MacBench Processor test measures the speed of a Mac's central processing unit and its interaction with both system RAM and cache RAM. The MacBench Floating Point test measures floating-point-math operations such as the trigonometric calculations used heavily for 3-D-rendering tasks. The MacBench Disk Mix test measures the speed with which a Mac's hard drive, driver software, and SCSI bus or IDE connector can move data to and from the disk. And the MacBench Video Mix test measures how quickly a Mac's video-display hardware and driver software can handle graphics and text operations.

Plenty That's New

We're most excited by the new Disk Mix and Video Mix tests in MacBench 2.0. Although these tests were created in much the same way as those for MacBench 1.0, we performed even more exhaustive research this year. We began by gathering market-share data on 12 of the most popular Mac applications: Word and WordPerfect, Excel, ClarisWorks, FileMaker Pro, Persuasion and PowerPoint, PageMaker and QuarkXPress, Illustrator and FreeHand, and Photoshop.

We contacted the vendors of these applications — and did a little investigation of our own — to find out what tasks people most commonly perform when they use these programs. From this information, we developed a sequence of typical tasks a user might perform with each of them. ZDBOp monitored the disk- and video-related calls these tasks generated within the Mac's operating system (a process called profiling) and used the results to design MacBench 2.0.

When you run MacBench's Disk Mix and Video Mix tests, you are actually playing back a distillation of the system calls that typical tasks in the most popular Mac applications generate. The frequency of each call is in proportion to the frequency with which it occurred during profiling. In other words, MacBench's Disk Mix and Video Mix tests exercise your Mac's disk and video subsystems in the same way as typical tasks with typical applications. We weighted the results to reflect each application's share of the Mac-software market. The whole process is what makes MacBench's Disk Mix and Video Mix tests such accurate predictors of performance.

Of course, you may not be a typical user. No problem: MacBench 2.0 has a host of more specific disk and video tests as well, so you can select a suite of tests tuned to your specific needs.

The Smaller Changes

Improved tests are the main news in MacBench 2.0, but there are other changes too. One important point to note is that version 2.0 uses a different baseline Mac from the one for version 1.0. For MacBench 1.0, we used an LC III as a baseline, or reference, Mac, assigning it a score of 10 for each of the four major tests. Scores for all the other Macs were normalized to those of the LC III. With version 2.0, we have changed the reference Mac to a Quadra 630, again assigning it a score of 10 for each of the four major tests. So don't try to compare scores from MacBench 1.0 and 2.0 — it won't work.

MacBench 2.0 also sports an improved interface. Its snazziest new feature is support for System 7.5's Drag and Drop. If, for example, you drag a previously saved test-results file from the Finder directly into a performance graph in MacBench, the graph will update instantly.

As part of our annual state-of-the-Mac roundup, we ran MacBench 2.0 on all of Apple's currently shipping Mac models (with the exception of the Power Mac 8100/110, which wasn't shipping at test time; the Performas, which are identical to the LCs we did test; and the Workgroup Servers, which are used differently from desktop Macs). We also retested a few representative old-time standards to see how they stacked up. No big surprises were in store, however: The speed of Power Macs on the Processor and Floating Point tests has shifted the entire Mac performance curve so dramatically that machines such as the IIfx, which

Quick Guide

MacUser ZD LABS **Here's the key information** you need to choose the right Mac. Based on our experiences, we gave each currently shipping nonserver Mac an overall mouse rating to reflect its value in today's lineup and then rated the Macs according to their suitability for a variety of common tasks. We also collected test results for each Mac, even including a few old-timers to see how their performance stacked up.

For our tests, we set each Mac up in the configuration listed, running System 7.5 and with its display set at 640 x 480 pixels. We then ran MacBench 2.0 to find the speed of the Mac's processor, floating-point unit, and disk and video subsystems. The reference Mac for MacBench 2.0 is a Quadra 630, which gets an index of 10 for each of the four tests; all the other indexes are normalized to the Quadra 630's. Because the reference Mac for MacBench 1.0 was an LC III, MacBench 1.0 and 2.0 scores cannot be compared.

in its day was considered "wicked fast," barely make a showing on today's chart.

Some less obvious results emerged in the Disk Mix and Video Mix tests. In the Disk Mix test, our reference Mac, the Quadra 630 (and the similarly configured LC 630), outperformed nearly every other Mac, including the Power Mac 8100/80 (see "SCSI and Storage" to find out why). From the Video Mix test, we learned that although the AV and non-AV models of the Power Mac 7100/66 and 8100/80 come with VRAM, video tasks on the AV models run upwards of 10 percent faster than the same tasks on non-AV models.

MacBench is an extremely sensitive benchmark-test utility. On more than one occasion, it has revealed some little detail about a new Mac that Apple would have preferred we didn't discover. Over the course of the next year, we will use MacBench 2.0 extensively to test new Macs; processor upgrades; and peripherals such as video cards, disk drives, and even CD-ROM drives.

There's also the do-it-yourself plan. Interested in a new piece of hardware but unsure how well it performs? Take a copy of MacBench to your local dealers, ask them to configure the system you're interested in, and run the tests yourself. You can get a free copy of MacBench 2.0 by faxing a request directly to ZDBOp at 919-380-2879 or by downloading it from ZiffNet/Mac.

Macs Tested	Suitability			Configuration Tested			MacBench 2.0 Indexes			
⊕ = OUTSTANDING ● = ACCEPTABLE ⊖ = POOR	BUSINESS	GRAPHICS	SMALL OFFICE	RAM (MB)	HARD-DRIVE MECHANISM (CAPACITY IN MB)	VIDEO SOURCE (BIT DEPTH)	PROCESSOR 0–40	FLOATING POINT 0–120	DISK 0–15	VIDEO 0–20
Power Mac 8100/80	●	⊕	⊖	16	Seagate ST11200N (1,000)	DRAM (8)	36	103	7	15
Power Mac 8100/80	●	⊕	⊖	16	Seagate ST11200N (1,000)	VRAM card (8)	36	103	7	18
Power Mac 8100/80AV	●	⊕	⊖	16	Quantum LPS540S (540)	AV card (8)	36	103	9	16
Power Mac 7100/66	⊕	⊕	●	8	Seagate ST3600N (500)	DRAM (8)	26	97	5	12
Power Mac 7100/66	⊕	⊕	●	8	Seagate ST3600N (500)	VRAM card (8)	27	97	5	13
Power Mac 7100/66AV	⊕	⊕	●	16	Quantum LPS540S (540)	AV card (8)	27	98	7	12
Power Mac 6100/60	⊕	●	●	8	Quantum LPS270S (270)	DRAM (8)	23	88	7	11
Quadra 950	⊖	⊕	⊖	16	Digital DSP3105S (1,000)	VRAM (8)	10	10	11	11
Quadra 630	●	⊖	⊕	8	Quantum IDE LPS270A (270)	VRAM (8)	10	10	10	10
Quadra 605	●	⊖	⊕	8	Quantum CTS160S (160)	VRAM (8)	7	1	5	9
PowerBook 540c	⊕	●	●	12	IBM H2344-S4C (320)	VRAM (8)	9	1	4	7
PowerBook 540	⊕	⊖	●	12	Conner CFN250S (250)	VRAM (4)	9	1	5	9
PowerBook 520c	⊕	⊖	●	12	Quantum GO160S (160)	VRAM (8)	7	<1	5	6
PowerBook 520	⊕	⊖	●	12	IBM H2172-S2C (160)	VRAM (4)	7	<1	4	7
PowerBook 150	●	⊖	●	8	Quantum IDE GLS127A (120)	VRAM (2)	3	<1	6	5
PowerBook Duo 280c	⊕	●	●	12	IBM H2344-S4C (320)	VRAM (8)	9	1	4	9
PowerBook Duo 280	⊕	⊖	●	12	IBM H2258-S3C (240)	VRAM (4)	9	1	4	11
Mac LC 630*	NA	NA	NA	8	Quantum IDE LPS270A (270)	VRAM (8)	9	1	10	10
Mac LC 575*	NA	NA	NA	8	Quantum LPS270S (270)	VRAM (8)	9	1	8	11
Mac LC 550*	NA	NA	NA	8	Quantum CTS160S (160)	VRAM (8)	3	<1	5	4
Mac LC 475*	NA	NA	NA	8	Quantum CTS160S (160)	VRAM (8)	7	<1	5	9
Mac LC III*	NA	NA	NA	8	Quantum CTS160S (160)	VRAM (8)	2	<1	4	4
Performa 6100 series†	⊕	●	●							
Performa 630 series§	●	⊖	⊕							
Performa 570 series§	●	⊖	⊕							
Performa 550§	⊖	⊖	⊕							
Performa 475/476§	⊖	⊖	⊕							
DISCONTINUED MACS TESTED										
Quadra 840AV				16	Seagate ST3600N (500)	VRAM (8)	12	12	6	11
Quadra 700				8	Quantum LP240S (240)	VRAM (8)	8	8	7	8
Quadra 610				8	Quantum LP240S (240)	VRAM (8)	8	8	7	9
Mac IIfx				8	Quantum Pro (80)	display card (8)	5	6	5	5
Mac IIci				8	Quantum CTS160S (160)	DRAM (8)	2	3	4	4
Mac II				8	Quantum Pro (80)	display card (8)	1	2	4	2
Mac LC				10	Quantum CTS80S (80)	VRAM (8)	<1	<1	3	2
Mac Classic				4	Quantum LPS (80)	VRAM (1)	<1	<1	1	1
Mac SE				4	Quantum Pro (80)	VRAM (1)	<1	<1	1	1

*LCs are currently available only through the Apple Educator Program.

†We did not test this Mac, but since it uses the same hardware as the Power Mac 6100/60, its performance should be the same.

§We did not test these Macs, but since they use the same hardware as their LC equivalents, their performance should be the same.

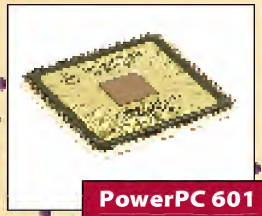
Processor and Memory

The Mac's mind and soul — the processor and RAM — are the two most important system components to understand. Although there's a lot to say about these parts, we've narrowed down the list to our top hints.

CURRENTLY SHIPPING MACS

	PROCESSOR	CLOCK SPEED	MAXIMUM RAM	SIMM TYPE	SIMM SPEED	SIMM SLOTS	L2 CACHE	FPU
Power Mac 8100/110	PPC 601	110 MHz	264 MB	72-pin	80 ns	8	●	●
Power Mac 8100/80	PPC 601	80 MHz	264 MB	72-pin	80 ns	8	●	●
Power Mac 8100/80AV	PPC 601	80 MHz	264 MB	72-pin	80 ns	8	●	●
Power Mac 7100/66	PPC 601	66 MHz	136 MB	72-pin	80 ns	4	●*	●
Power Mac 7100/66AV	PPC 601	66 MHz	136 MB	72-pin	80 ns	4	●*	●
Power Mac 6100/60	PPC 601	60 MHz	72 MB	72-pin	80 ns	2	●*	●
Quadra 950	68040	33 MHz	256 MB	30-pin	80 ns	16		●
Quadra 630	68040	33 MHz	36 MB	72-pin	80 ns	1		●
Quadra 605	68LC040	25 MHz	36 MB	72-pin	80 ns	1		
PowerBook 540c	68LC040	33 MHz	36 MB	card	70 ns	1		
PowerBook 540	68LC040	33 MHz	36 MB	card	70 ns	1		
PowerBook 520c	68LC040	25 MHz	36 MB	card	70 ns	1		
PowerBook 520	68LC040	25 MHz	36 MB	card	70 ns	1		
PowerBook 150	68030	33 MHz	40 MB	card	70 ns	1		
PowerBook Duo 280c	68LC040	33 MHz	40 MB	card	70 ns	1		
PowerBook Duo 280	68LC040	33 MHz	40 MB	card	70 ns	1		
PowerBook Duo Dock II	NA	NA	NA	NA	NA	NA	●	●
PowerBook Duo Dock	NA	NA	NA	NA	NA	NA		●*
Mac LC 630	68LC040	33 MHz	36 MB	72-pin	80 ns	1		
Mac LC 575	68LC040	33 MHz	36 MB	72-pin	80 ns	1		
Mac LC 550	68030	33 MHz	36 MB	72-pin	80 ns	1		●*
Mac LC 475	68LC040	25 MHz	36 MB	72-pin	80 ns	1		
Mac LC III	68030	25 MHz	36 MB	72-pin	80 ns	1		●*
Performa 6100 series	PPC 601	60 MHz	72 MB	72-pin	80 ns	2	●*	●
Performa 630 series	68LC040	33 MHz	36 MB	72-pin	80 ns	1		
Performa 570 series	68LC040	33 MHz	36 MB	72-pin	80 ns	1		
Performa 550	68030	33 MHz	36 MB	72-pin	80 ns	1		●*
Performa 475/476	68LC040	25 MHz	36 MB	72-pin	80 ns	1		
Workgroup Server 9150	PPC 601	80 MHz	264 MB	72-pin	80 ns	8	●	●
Workgroup Server 8150	PPC 601	80 MHz	264 MB	72-pin	80 ns	8	●	●
Workgroup Server 6150	PPC 601	60 MHz	72 MB	72-pin	80 ns	2	●	●
Workgroup Server 95	68040	33 MHz	256 MB	30-pin	80 ns	16	●*	●

*Optional.





	PowerPC 601	68040
NUMBER OF TRANSISTORS	2.8 million	1.2 million
CACHE SIZE	32K	8K
DATA BUS	64 bits	32 bits
DIE SIZE	11 x 11 mm	14.5 x 15.5 mm



Force applications to load into RAM. Some applications let you force all their resources into RAM, thereby saving unnecessary, battery-sapping trips to the disk. Look for this option under Preferences.

DETAIL PHOTOGRAPHY / FRED STIMSON TECHNICAL ILLUSTRATION / GIAMPIERO BENVENUTI, MARK SWEENEY

Processor and Memory Tips

Setting the disk cache correctly can improve overall system performance. You can change the size of the disk cache via the Memory control panel. As a general rule, you should allot 32K for every 1 MB of installed RAM, to a maximum of 128K. (If you use System 7.5, there is no performance penalty for using a higher setting.) When you use Photoshop, which has its own memory schemes, leave the disk cache set to 32K.

Turn on virtual memory on your Power Mac. Yes, you read correctly. Because of the manner in which native Power Mac applications store their code, enabling virtual memory makes applications launch faster — and allows them to run in a smaller memory partition. Try setting virtual memory to 1 MB more than the installed RAM (for example, on a machine with 8 MB, set virtual memory to 9 MB). Note that Connectix's RAM Doubler offers the same functionality as enabling virtual memory; you can't use both at once, however.

Add a Level 2 cache card if your Mac supports one. You'll gain an overall processor-performance boost of 10 to 40 percent — for under $300.

Avoid memory fragmentation. Launch applications that have the highest memory allocations first, and quit the applications in the reverse order. For example, launch Photoshop first, then Word, and then SimpleText; quit SimpleText first, then Word, and finally Photoshop.

Install Connectix's RAM Doubler. If you're running low on RAM, try installing RAM Doubler. It's cheaper and easier to install than a bunch of new SIMMs.

Before buying SIMMs, find out what type and speed your Mac requires. Most currently shipping desktop Macs use 72-pin SIMMs, but the speed requirements vary. Be sure that the SIMMs you buy are fast enough for your Mac — otherwise, you'll encounter crashes or your Mac may fail to boot. (SIMM speeds are measured in nanoseconds.)

Don't expect a speed boost if you install SIMMs that are faster than the ones recommended for your Mac. The only reason to purchase faster-than-required SIMMs is if you need more RAM for your present Mac but plan to upgrade to a faster Mac soon. In that case, buy RAM that is rated fast enough for the new Mac.

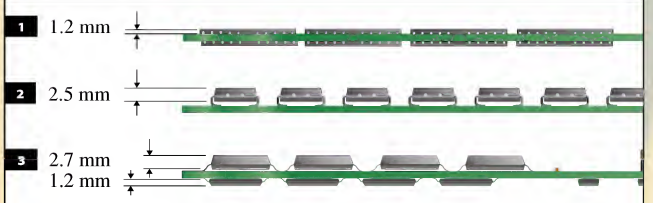
Don't skimp when adding RAM to a Mac that contains only one RAM-expansion slot. Otherwise, if you need to add more RAM later, you'll be stuck with unused RAM.

You must install SIMMs in pairs in the Power Macs. You can, however, install SIMMs of different sizes *and* speeds in different banks — as long as they're a match within each bank. For example, you can use two 60-nanosecond, 8-MB SIMMs in the first two adjoining slots; two 80-nanosecond, 4-MB SIMMs in the next two adjoining slots; and so on (no descending or ascending order of SIMM-pair sizes is necessary).

If you get this dreaded message when you try to launch an application (and you know you've got plenty of RAM), then try quitting the last application you opened. If a similar message occurs within an application, quit the application and then try increasing the application's memory partition via the Get Info box. If neither remedy works, you'll need to restart your Mac.



PowerBook RAM



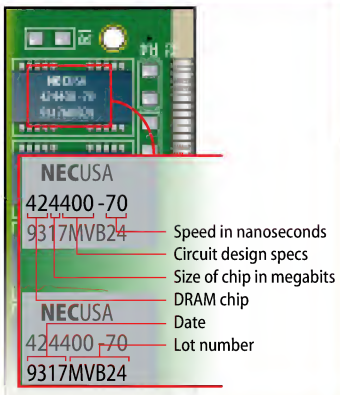
1 TSOP (thin small-outline package) RAM-expansion cards are almost always small enough to fit into any PowerBook. In fact, they are the only cards that do fit in a 500-series PowerBook.

2 SOJ (small-outline J-lead) RAM-expansion cards are thicker than TSOP cards. Be sure to ask vendors if their cards will fit in your PowerBook before you purchase them.

3 Flat-pack RAM-expansion cards are somewhere between SOJ and TSOP cards in size. Again, ask vendors if their cards will fit in your PowerBook before you purchase them.

How to Read a SIMM

The numbers on SIMMs aren't meaningless — if you can decode them. This NEC SIMM has eight 4-megabit chips. Since there are eight bits in a byte, simple arithmetic tells us this is a 4-megabyte chip. Unfortunately, each manufacturer has its own codes.



MacBench 2.0

No surprises here. Power Macs overwhelmed all other Macs in the MacBench 2.0 Processor and Floating Point tests, with the Power Mac 8100/80 leading the pack. Macs that use 68040s (the Quadra 950 and 630) followed.

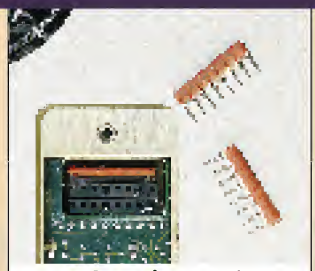
To get an idea of how powerful the Power Macs are for floating-point-intensive tasks such as rendering, check the MacBench Floating Point Indexes. Macs that lack an FPU, such as the 500-series PowerBooks, which use a 68LC040 processor, had a score of 1 or less; Power Macs, on the other hand, had indexes of 88 and above.

SCSI and Storage

A Field Guide to Terminators



Standard **external terminators** use resistors to keep SCSI signals from running amok. These terminators are the most common.



Internal terminators also use resistors, but they can be more effective. On the minus side, you can't remove them easily.

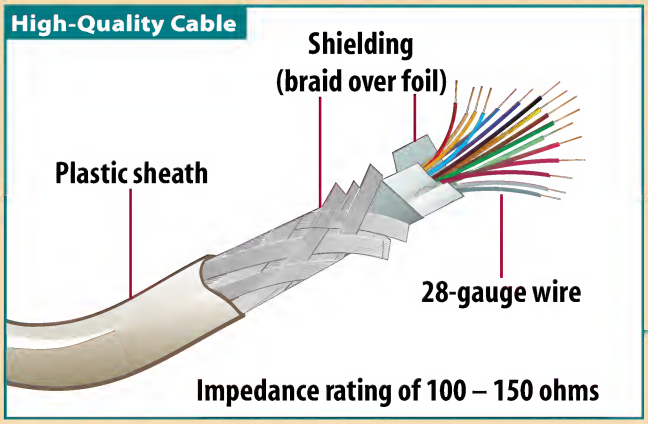
CURRENTLY SHIPPING MACS

	MAXIMUM THROUGHPUT	DUAL SCSI BUSES	SCSI MANAGER 4.3 IN ROM	HARD DRIVES AVAILABLE	CD-ROM DRIVE INCLUDED
Power Mac 8100/110	5 MB/sec	●	●	2 GB	●
Power Mac 8100/80	5 MB/sec	●	●	500 MB, 1 GB	●*
Power Mac 8100/80AV	5 MB/sec	●	●	500 MB	●
Power Mac 7100/66	5 MB/sec		●	500 MB	●*
Power Mac 7100/66AV	5 MB/sec		●	500 MB	●
Power Mac 6100/60	5 MB/sec		●	250 MB, 350 MB	●*
Quadra 950	5 MB/sec	●		230 MB, 500 MB, 1 GB	
Quadra 630	3 MB/sec			250 MB	
Quadra 605	3 MB/sec			160 MB, 250 MB	
PowerBook 540c	5 MB/sec			320 MB, 500 MB	
PowerBook 540	5 MB/sec			240 MB	
PowerBook 520c	5 MB/sec			160 MB, 320 MB	
PowerBook 520	5 MB/sec			160 MB	
PowerBook 150	1.5 MB/sec			120 MB	
PowerBook Duo 280c	NA			320 MB	
PowerBook Duo 280	NA			240 MB	
PowerBook Duo Dock II	5 MB/sec			none	
PowerBook Duo Dock	5 MB/sec			230 MB	
Mac LC 630	3 MB/sec			250 MB	●*
Mac LC 575	5 MB/sec			160 MB	●
Mac LC 550	1.5 MB/sec			160 MB	●
Mac LC 475	5 MB/sec			80 MB, 160 MB	
Mac LC III	1.5 MB/sec			40 MB, 80 MB, 160 MB	
Performa 6100 series	5 MB/sec		●	250 MB, 350 MB, 500 MB	●
Performa 630 series	3 MB/sec			250 MB	●*
Performa 570 series	5 MB/sec			250 MB, 320 MB	●
Performa 550	1.5 MB/sec			160 MB	●
Performa 475/476	5 MB/sec			160 MB, 230 MB	
Workgroup Server 9150	5 MB/sec	●	●	1 GB, 2 GB	●
Workgroup Server 8150	5 MB/sec	●	●	500 MB, 1 GB	●*
Workgroup Server 6150	5 MB/sec		●	500 MB	●
Workgroup Server 95	5 MB/sec	●		1 GB, 2 GB	●*

*Optional.

The Mac's main connector to the outside world of peripherals, the SCSI port, is notoriously finicky. Here are rules to know and use.

High-Quality Cable

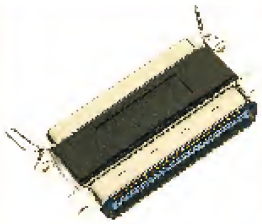


Use high-quality cables. Conventional wisdom says that thick cables are better than thin ones. But the only real way to identify a high-quality cable is to buy one; cut it open; look for the characteristics shown here; and if it passes the test, buy more.

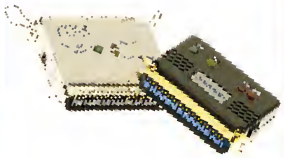


Attach an AC adapter when you use external devices with your PowerBook. Otherwise, you'll notice a definite drop in battery life. SCSI devices require a great deal of battery power for termination.

DETAIL PHOTOGRAPHY / FRED STIMSON TECHNICAL ILLUSTRATION / GIAMPIERO BENVENUTI



Black terminators use capacitors as well as resistors. Although designed for (and required by) the Mac IIfx, you can use them with any Mac.



Any type of terminator can provide **active termination,** which actively works to regulate voltage, thereby cutting down signal noise.



If you live in a rural area, consider "bug proofing" your SCSI devices. Arachnids like to set up house in warm and cozy places — such as electronic devices. You can thwart their efforts by encasing SCSI devices in pantyhose.

MacBench 2.0

Check out the MacBench 2.0 Disk Mix test results for the Quadra 630 and the LC 630. The hard drives of these Macs outran those in nearly every other Mac because the internal drive in the 630 is connected via an IDE (Integrated Drive Electronics) interface, the standard on PC and Windows machines, not via SCSI, common on most Macs. Drives that can connect via an IDE interface operate more efficiently than SCSI drives, and they also have a speed-enhancing write cache enabled. (You can enable the write cache on any Apple internal drive via FWB's Hard Disk ToolKit.) Note that the 630s still have an external SCSI port like the rest of the Mac family.

SCSI Tips

Keep your SCSI chain short. Official SCSI specs say a SCSI chain should be no more than 20 feet long. Practical experience says the shorter, the better.

Keep your cables short. The maximum length you should allow between devices is 3 feet.

Never assign the same SCSI-ID number to two devices residing on the same bus. SCSI uses these numbers as addresses to ensure that information goes to the correct location. Giving two devices the same address can result in lost information.

Know that some SCSI-ID numbers may be preassigned. The Mac's internal hard drive is usually set to 0 (if your Mac has two internal hard drives, the second one will be set to 1), the Duo Dock's internal hard drive is set to 1, an internal tape drive is set to 2, an internal CD-ROM drive is set to 3, and the Mac's motherboard is set to 7.

If you don't have an internal hard drive, have your dealer install an internal terminator. Some Macs, such as the Power Macs and the Quadra 950, already have termination on the motherboard, but most other Macs benefit from the addition of an internal terminator.

There's more than one way to choose a startup disk. Your Mac's startup procedure includes a sequential search for a startup disk. First, the Mac checks the internal floppy drive; then the SCSI device you've selected as the startup drive; and finally, other attached SCSI devices, starting with SCSI-ID 0, jumping to 6, and then working its way down to 1. Here's how you can alter that sequence:

1. To bypass an internal floppy drive, hold down the mouse button when you power up.

2. To bypass an internal hard drive, hold down the Shift, Option, Command, and Delete keys simultaneously. (Release the keys when the flashing question mark appears.)

Always terminate the first and last devices on the chain. Drives purchased specifically for internal use nearly always arrive with terminators installed. If in doubt, call the vendor you purchased a device from.

If the last device on the chain has two SCSI connectors, attach the cable to one and a terminator to the other. Otherwise, you'll have an open connector that may cause noise on the SCSI chain.

Upgrade to SCSI Manager 4.3. If you have a 68040 Mac or a Power Mac, SCSI Manager 4.3 will give your drive *asynchronous-transfer* ability — your Mac will be able to continue processing while the drive reads and writes data. Some Macs come with SCSI Manager 4.3 in ROM; others must be upgraded with System 7.5, which includes SCSI Manager 4.3.

If you use SCSI Manager 4.3, make sure your SCSI device drivers are *fully* compatible with it. Although most vendors have upgraded their driver software to be *compatible* with SCSI Manager 4.3, not all have upgraded their code to take full advantage of its new capabilities. It's worth a phone call to find out if you've got a version that does.

Always turn off the power to your Mac and your SCSI devices before swapping cables or moving devices around. SCSI devices aren't as tough as bowling balls. And SCSI cables contain sensitive data-transmission lines *and* one or more live power wires.

Turn on your SCSI devices before you turn on the Mac. Some SCSI devices won't mount if they're not running when you power up your Mac. Shutting down your Mac and *then* the attached SCSI devices allows your system to completely "flush" itself.

Don't buy a superfast hard drive if your Mac's SCSI connection can't keep up. Use the table to find your Mac's maximum throughput. Or buy a Fast or Wide SCSI-2 card to increase your Mac's throughput.

Built-in Video

We used to complain about the Mac's tiny, 9-inch screen. Now we complain about the complexity of understanding VRAM, bit depths, and resolutions. Here's some help with those complaints.

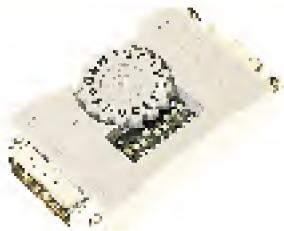
CURRENTLY SHIPPING MACS

	INSTALLED VRAM	MAXIMUM VRAM	MAXIMUM BIT DEPTH AT 640 X 480 PIXELS	832 X 624 PIXELS	1,024 X 768 PIXELS
Power Mac 8100/110	2 MB	4 MB	24-bit	24-bit	24-bit
Power Mac 8100/80	2 MB	4 MB	24-bit	24-bit	24-bit
Power Mac 8100/80AV	2 MB	2 MB	24-bit	24-bit	16-bit
Power Mac 7100/66	1 MB	2 MB	24-bit	24-bit	16-bit
Power Mac 7100/66AV	2 MB	2 MB	24-bit	24-bit	16-bit
Power Mac 6100/60	DRAM	DRAM	16-bit	8-bit	NA
Quadra 950	1 MB	2 MB	24-bit	24-bit	16-bit
Quadra 630	1 MB	1 MB	16-bit	8-bit	NA
Quadra 605	512K	1 MB	16-bit	16-bit	8-bit
PowerBook 540c	512K	512K	8-bit	8-bit	NA
PowerBook 540	512K	512K	8-bit	8-bit	NA
PowerBook 520c	512K	512K	8-bit	8-bit	NA
PowerBook 520	512K	512K	8-bit	8-bit	NA
PowerBook 150	128K	128K	2-bit	NA	NA
PowerBook Duo 280c	512K	512K	8-bit	NA	NA
PowerBook Duo 280	512K	512K	8-bit	NA	NA
PowerBook Duo Dock II	1 MB	1 MB	16-bit	16-bit	NA
PowerBook Duo Dock	512K	1 MB	16-bit	16-bit	NA
Mac LC 630	1 MB	1 MB	16-bit	8-bit	NA
Mac LC 575	512K	1 MB	16-bit	NA	NA
Mac LC 550	512K	768K	16-bit	NA	NA
Mac LC 475	512K	1 MB	16-bit	16-bit	8-bit
Mac LC III	512K	768K	16-bit	8-bit	NA
Performa 6100 series	DRAM	DRAM	16-bit	8-bit	NA
Performa 630 series	1 MB	1 MB	16-bit	8-bit	NA
Performa 570 series	1 MB	1 MB	16-bit	NA	NA
Performa 550	768K	768K	16-bit	NA	NA
Performa 475/476	512K	1 MB	16-bit	16-bit	8-bit
Workgroup Server 9150	DRAM	4 MB	24-bit	24-bit	24-bit
Workgroup Server 8150	DRAM	4 MB	24-bit	24-bit	24-bit
Workgroup Server 6150	DRAM	1 MB	16-bit	16-bit	8-bit
Workgroup Server 95	1 MB	2 MB	24-bit	24-bit	16-bit

IF YOUR MONITOR is an immigrant from the PC world of Windows and DOS, you're almost certain to need a *dongle,* or adapter, before it'll work correctly with your Mac. Dongles emulate the three "sense code" pins on Apple monitors. These pins tell your Mac's video circuitry what resolution and frequency to enable. A dongle also allows a PC monitor's VGA-style connector to work with the Mac's video cable.



Single-mode dongles emulate only a single type of Apple monitor. If, however, you have a Quadra, a Power Mac, or a PowerBook and you use a single-mode dongle that emulates Apple's new Multiple Scan monitors, you can still switch resolutions on the fly.



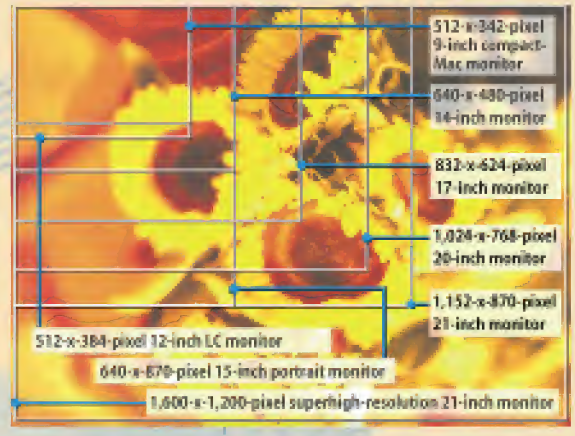
Versatile — if complicated — dongles, such as the Sony model shown here, support many frequencies and resolutions and can be used with just about every monitor and Mac — a great convenience if you're managing an office full of equipment.

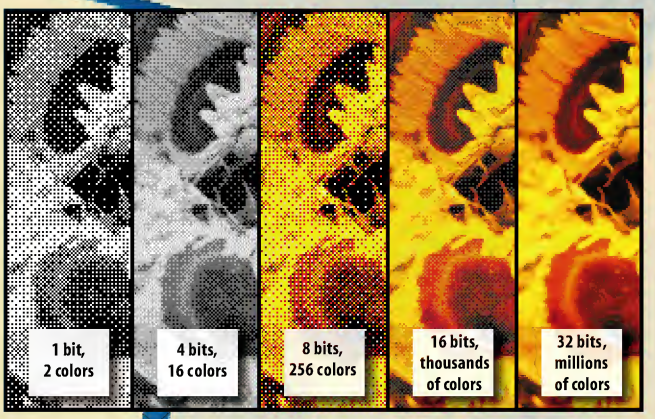


You don't need a dongle if you use NEC's MultiCable, which has a VGA connector on one end and a Mac connector on the other. New high-end NEC monitors that use this cable have VGA as well as Mac video ports: To switch your monitor from a Mac to a PC — or vice versa — you simply turn the cable around.

DETAIL PHOTOGRAPHY / FRED STIMSON

Mies van der Rohe was wrong: When it comes to choosing a Mac video system, more is most definitely more. The 1,600-x-1,200-pixel *superhigh resolution* provided by the SuperMac Thunder II GX•1600 card, for example, provides over six times as many image-carrying pixels as the Mac's longtime 640-x-480-pixel standard. The more pixels your display has, the more you can see of the image you're working on.





The original Macs used only 1-bit color — in other words, they used monochrome displays. We've come a long way since then. Many Macs now can display millions of colors, although most people will find thousands of colors enough.

Video Tips

Match your VRAM to your Mac very carefully. The match between VRAM SIMMs and Mac model is critical. For example, the VRAM SIMMs used in the Power Mac 7100/66 and 8100/80 VRAM-expansion cards have the same pin assignments and external dimensions, but they are *not* interchangeable. When buying VRAM, always specify the Mac you intend to install it in.

DRAM SIMMs can't be used to expand video RAM. We're still hearing false claims about those old leftover 256K DRAM SIMMs being recyclable as VRAM in LCs and Quadras. The truth is this doesn't work, so don't try it.

Before you buy a third-party video card, make sure you've installed all the VRAM you can. Find out what the maximum VRAM is for your Mac and what bit depth that will give you on the monitor you want to use. You may find that you can get by with a simple VRAM upgrade rather than a costly video-card upgrade.

Adding DRAM to a Mac with DRAM-based video won't improve its video speed. The non-AV Power Macs use a portion of their main memory for video. Adding more DRAM SIMMs will neither affect the amount of memory allocated to video nor improve video speed.

To use the AV functions on Power Macs, you must attach your monitor to the AV card. Among other things, this means that it's not all that wise to buy an expensive video accelerator, thinking you can tap into the AV technologies with it. But if you upgrade to a large-monitor/video-card combo, you should keep your old monitor around for video captures and other assorted AV novelties.

Don't use the HDI-45 connector on the AV Power Macs unless a monitor is attached to the AV card. If you do, be prepared for some spooky stuff. For example, the Monitor control panel will assume that a device is attached to the video-out connector on the AV card, resulting in the creation of a nonexistent monitor. Phantom that it is, this ghost monitor can do scary things, such as suck up files, folders, and even entire windows you may inadvertently move to it.

You may have more resolutions available than you know about. If you're using your Mac's built-in video, click on the Options button in the Monitors control panel. A list of available resolutions will appear. This works only if you have the appropriate multifrequency dongle or cable and the appropriate on-the-fly resolution-switching Monitor extension. (The extensions are included in System 7.5.)

Use several monitors as one. If you have a few monitors and two or more video ports on your Mac, you can use the Monitors control panel to set up one big, virtual desktop. Open the Monitors control panel and click on Identify. Drag the monitor tiles and the menu bar to their appropriate locations. If you're running System 7.5, you'll see changes immediately; if not, you must restart.

Using multiple monitors near each other may cause interference. If you experience this, try repositioning the monitors so their backs are as far away from each other as possible. Also, if your monitors have a variety of refresh rates, try repositioning them so that those with the most divergent rates are farthest from each other.

How to get your old monitor to work with your new Mac. Older Macs use the green-output pin to synchronize video signals. All new Macs, however, spread sync signals across more pins. Thus older monitors that require sync on green will not work properly with many new Macs. (Of the currently shipping Macs, only the Quadra 950 and the Workgroup Server 95 support sync on green.) If you are a victim of this old-monitor/new-Mac mismatch, you've got two choices: Upgrade to a newer monitor (expensive), or purchase a $40 video adapter from Griffin Communications (615-259-0090).

MacBench 2.0

We tested the Power Macs in all of their video configurations: running video from DRAM, running video from standard VRAM, and running video from an AV card that contains VRAM. Power Macs equipped with standard VRAM video were the fastest in the MacBench 2.0 Video Mix test. In fact, a Power Mac 8100/80 using standard VRAM to run a monitor can display 24-bit data as fast as a 68040 Mac running an older QuickDraw-accelerator card can.

Expansion Slots

Upgrading your Mac via plug-in cards is a great idea — but unfortunately, it can be harder than it sounds. Here are some hints.

CURRENTLY SHIPPING MACS

	NUMBER OF PDSs	NUMBER OF 12-INCH NUBUS SLOTS	NUMBER OF 7-INCH NUBUS SLOTS	DAV/ VIDEO SLOT	COMMUNI-CATIONS SLOT
Power Mac 8100/110	1*	3	0		
Power Mac 8100/80	1*	3	0		
Power Mac 8100/80AV	1*	3	0	●†	
Power Mac 7100/66	1*	3	0		
Power Mac 7100/66AV	1*	3	0	●†	
Power Mac 6100/60	1§	0	1§		
Quadra 950	1§	1§	0		
Quadra 630	1	0	0	●	●
Quadra 605	1	0	0		
PowerBook 540c	1◊	0	0		
PowerBook 540	1◊	0	0		
PowerBook 520c	1◊	0	0		
PowerBook 520	1◊	0	0		
PowerBook 150	0	0	0		
PowerBook Duo 280c	1	0	0		
PowerBook Duo 280	1	0	0		
PowerBook Duo Dock II	0	2	0		
PowerBook Duo Dock	0	2	0		
Mac LC 630	1	0	0	●	●
Mac LC 575	1	0	0		●
Mac LC 550	1	0	0		
Mac LC 475	1	0	0		
Mac LC III	1	0	0		
Performa 6100 series	1§	0	1§		
Performa 630 series	1	0	0	●	●
Performa 570 series	1	0	0		●
Performa 550	1	0	0		
Performa 475/476	1	0	0		
Workgroup Server 9150	1	4	0		
Workgroup Server 8150	1	3	0		
Workgroup Server 6150	1§	0	1§		
Workgroup Server 95	1	5	0		

*Filled with either a VRAM or an AV card.
†With optional AV card.
§You can choose between a PDS and a NuBus slot.
◊You can choose among a PDS, an extra battery, and a PCMCIA cage.

Understanding PCMCIA Cards



Type 1 and Type II PCMCIA cards are 3.3 millimeters and 5 millimeters thick, respectively. Generally, these cards contain memory that increases your PowerBook's storage capacity or they contain modems. The 500-series PowerBooks can hold two of these cards at a time but may not be able to run both at once. Apple publishes a list of cards that can run together. To get the list, call 800-462-4396 in the U.S. and ask for Document #10307.



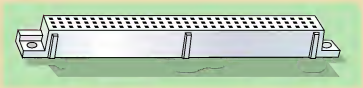
Type III PCMCIA cards, which are 10.5 millimeters thick, generally contain a hard drive or other rotating storage device.

Currently, only the 500-series PowerBooks use PCMCIA cards, but we expect a lot more Macs to support them in the future.

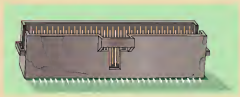
DETAIL PHOTOGRAPHY / FRED STIMSON • TECHNICAL ILLUSTRATION / CHAMPIERO BENVENUTI, MARK SWEENEY

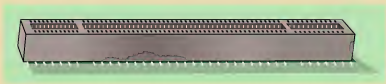
A Field Guide to Connectors

▼ NuBus connector

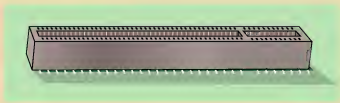


▼ DAV connector





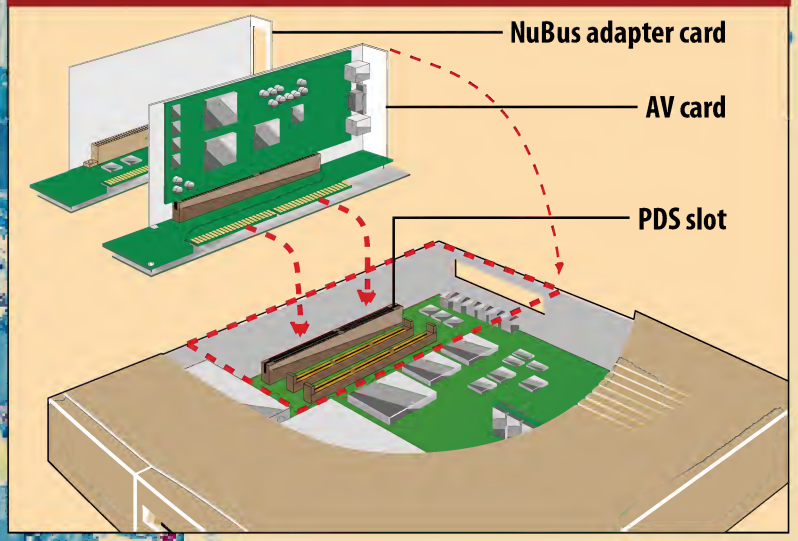
▲ PDS connector



▲ Communications connector

If you popped open the lid on your Mac, would you recognize the connectors? If not, here's how to identify them.

Power Mac Trade-Offs



Decisions, decisions. The Power Mac 6100/60's slim design means that it has room for only one of the following cards: a 6100 PDS card (only a DOS-compatible card is currently available), a 7-inch NuBus card, or an AV card.

Unused expansion slots can get dusty. *Too much* dust (or cat hair, if you work in a pet-filled household) can foul a slot's connections, thereby preventing cards from working properly. To clean your Mac's expansion slots, spray compressed air at an angle to the slot. Compressed air is readily available at photographic-supply stores.

Expansion-Slot Tips

When upgrading to a Power Mac, find out if you need native Power Mac drivers for your NuBus cards. Some NuBus cards need native drivers in order to run at peak speed; others don't. Check with the vendor for upgrades.

The Quadra 840AV has the highest NuBus speed of any Mac. With the Quadra 840AV, NuBus drivers can use the 68040's MOVE16 instruction to transfer data in 16-byte bursts. The PowerPC 601 does not support a similar instruction.

Bigger isn't necessarily better. NuBus slots can be either 7 inches or 12 inches long. You can get the same types of expansion cards, with the same features, for a slot of either size.

Look for upgrade options that don't require an expansion slot — especially if your Mac has only one. For example, if you want to upgrade to Ethernet, consider purchasing an external Ethernet box. Alternatively, if you must fill the slot (say, with a video card), look for a card that offers other features, such as Photoshop acceleration.

You'll want to equip your Mac with an AV card only if you plan to work with video frequently. The DAV connector on AV Macs was designed to address the speed concerns of users who need quick access to video. Most cards that use the DAV connector provide video compression and decompression.

The DAV slot is not the same as the video slot on the 630-series Macs. The 630 series Macs contain a new video slot that you can fill with Apple's Video System card for digitizing video and sound.

Fill the left battery compartment of a 500-series PowerBook with a battery or a PCMCIA cage. Don't hold out for expansion cards for these PowerBooks. To date, vendors have not opted to reengineer their PDS cards to fit into their tiny compartments.

If you want a low-cost option for adding a modem or Ethernet, check out Macs that have a communications slot. Starting with the LC 500 series, Apple began including a special communications slot that users could fill with either the Apple Express Modem or an Ethernet card. These options cost less than they do in external versions.

If you have a choice between a PDS and a NuBus slot, choose a NuBus one. PDS cards, although faster, must be designed with a specific Mac and processor in mind. As a result, several different shapes and sizes of PDS cards — very few of which are truly interchangeable — are available today. NuBus cards, on the other hand, vary only in size and are interchangeable.

MacUser ZD LABS

a Removables feast

Now you can store over 200 MB of data on a single SyQuest, Bernoulli, or magneto-optical cartridge. If you play your cards right, you can save some money too.

By Jim Shatz-Akin

The stories are all too familiar: You're a graphics pro needing to transfer ever larger files to a service bureau, or you've just landed a contract with a customer that requires you to send large amounts of time-critical data overnight. Maybe you are an engineer working on high-security projects that require you to lock up sensitive data every night. Or perhaps you simply need somewhere to park data you don't require all the time, so that it doesn't end up crowding your hard disk. The answer to your problems could lie with a high-capacity removable-storage system.

Removable-storage drives are functionally (although not technically) analogous to floppy-disk drives. When you insert a formatted cartridge into a removable-media drive, the cartridge mounts as a volume on your Macintosh's desktop. Just like floppies, cartridges can be used for backup or for storage.

This report focuses on removable-media drives based on three types of mechanism — SyQuest, Bernoulli, and magneto-optical. Each removable-media technology has strengths and weaknesses; before settling on a removable-media drive, get to know each type and see how well each is suited to the sort of work you do. To help you find a drive that meets your particular requirements, we tested 51 drives that use cartridges with capacities in the range of 200 to 270 MB — greater than those of many installed Macintosh hard disks.

An Overview of the Technology

Thirty-five of the drives we tested for this report use SyQuest mechanisms and have much in common with conventional hard drives: Each cartridge encloses an aluminum disk covered with a microscopic coating of magnetic material. Data is written to and read from the disk by a pair of electromagnetic heads mounted on the ends of radial arms that travel just above and below the disk's surface. We tested drives based on two varieties of SyQuest mechanisms — 17 of the drives have 5.25-inch, 200-MB mechanisms, and 18 have 3.5-inch, 270-MB ones.

Like SyQuest drives, Bernoulli removable-media drives use cartridges that contain disks coated with magnetic material; however, these disks are made of a flexible plastic similar to that used for floppy disks. Each cartridge contains a pair of disks sandwiched together. The drive contains a pair of read/write heads, one on each side of the disk

PHOTOGRAPHY / STEVEN UNDERWOOD


FOMEGA
Zip
PINNACLE MICRO
Tahoe

sandwich. Bernoulli systems take their name from a phenomenon known as the *Bernoulli effect:* As the disks spin, air moves from the center outward over them, passing between the disks and the heads. The resulting reduction in air pressure between the disks and the heads causes the disks to separate slightly, which moves the magnetic surfaces close enough to the heads to allow data transfer. The only Bernoulli drive we tested is sold by Iomega, the developer of the Bernoulli mechanism. Expect to also see Bernoulli drives from other vendors soon, however. As we went to press, Spin Peripherals announced plans to sell a Bernoulli drive for $399.

Magneto-optical drives, commonly called optical drives, use cartridges that each contain a plastic disc with metal particles embedded in its surface. The drive writes data to a given spot (domain) on the disc by using a tightly focused laser on one side of the disc and a high-intensity electromagnet on the opposite side: An intense laser pulse momentarily heats a sector of the disc to the *Curie point* of the embedded metal particles (302 degrees Fahrenheit). At this critical temperature, the metal's magnetic properties change, so the drive's electromagnet can influence the domain's magnetic polarity. The drive takes advantage of the *Kerr effect* to read data: A low-intensity laser beam reflected through a domain's polarized magnetic field twists clockwise or counterclockwise, depending on the domain's polarity. A sensor on the drive interprets the direction of the twist as a 1 or a 0.

Optical mechanisms are manufactured by a variety of firms. (The 15 drives we tested contained mechanisms from five manufacturers.) Most manufacturers have developed systems that use 3.5-inch cartridges with capacities of 230 MB each.

All the optical drives we tested, with the exception of OCEAN's, conform to an industry standard agreed on by numerous mechanism manufacturers. Mechanisms from companies such as Fujitsu, Laserbyte, Olympus, and Panasonic can all read from and write to the same 230-MB cartridges as well as to the older 128-MB variety. (SyQuest mechanisms are manufactured only by SyQuest, and Bernoulli mechanisms are made only by

The Bottom Line

MacUser ZD LABS ONCE YOU DECIDE on the removable-media technology that meets your compatibility, speed, and reliability requirements, you'll need to pick a drive. Weigh price, customer service (tech support and warranty), software features, and case design.

⊕ = OUTSTANDING
● = ACCEPTABLE
⊖ = POOR

270-MB SYQUEST DRIVES

	PRICE/ PERFORMANCE	CUSTOMER SERVICE	CONSTRUCTION AND DESIGN	DOCUMENTATION AND SOFTWARE
★★★★½ **MacProducts Magic SyQuest 270**	⊕	⊕	●	●

MacUser RECOMMENDS **A low price and lots of zip** make MacProducts' Magic SyQuest 270 ($399 direct) our choice for a 270-MB SyQuest drive. MacProducts' customer service is good, and the drive's case is nicely constructed.

★★★★½ Spin SyQuest 270	⊕	⊕	●	●
★★★★ APS SQ 3270	●	⊕	⊕	●
★★★½ ClubMac SyQuest 270	●	●	●	●
★★★½ La Cie Joule 270MB Removable Drive	●	⊕	●	●
★★★½ Mac Zone Performantz 270MB Removable	●	●	●	●
★★★½ MacConnection MDS SyQuest 270	●	⊕	●	●
★★★½ MacWarehouse PowerUser 270MB SyQuest Drive	●	●	●	●
★★★½ MASS Microsystems DataPak 3.5" Removable	●	●	●	●
★★★½ MaxConcept SL-SQ270C	●	⊕	●	●
★★★½ MicroNet Advantage 270 Removable	●	●	●	●
★★★½ Microtech RS 270	●	⊕	●	●
★★★½ Mirror 270 MB SyQuest	⊖	●	●	●

270-MB SYQUEST DRIVES, CONTINUED

	PRICE/ PERFORMANCE	CUSTOMER SERVICE	CONSTRUCTION AND DESIGN	DOCUMENTATION AND SOFTWARE
★★★½ Prima PDQ Portable 270 MB	●	⊕	●	●
★★★ Dynatek RMD 270	⊖	⊕	●	●
★★★ FWB HammerDisk PE 250	⊖	●	●	●
★★★ Liberty 50 Series 270 SyQuest	⊖	●	⊕	⊖
★★★ PLI Infinity 270 Turbo	●	●	●	⊖

200-MB SYQUEST DRIVES

	PRICE/ PERFORMANCE	CUSTOMER SERVICE	CONSTRUCTION AND DESIGN	DOCUMENTATION AND SOFTWARE
★★★★½ **APS SQ 5200**	⊕	⊕	⊕	●

MacUser RECOMMENDS **The quick, well-constructed** APS SQ 5200 ($499 direct) tops our list of 200-MB SyQuest drives. The drive has a good price as well as bells and whistles such as active termination, and APS provides excellent tech support.

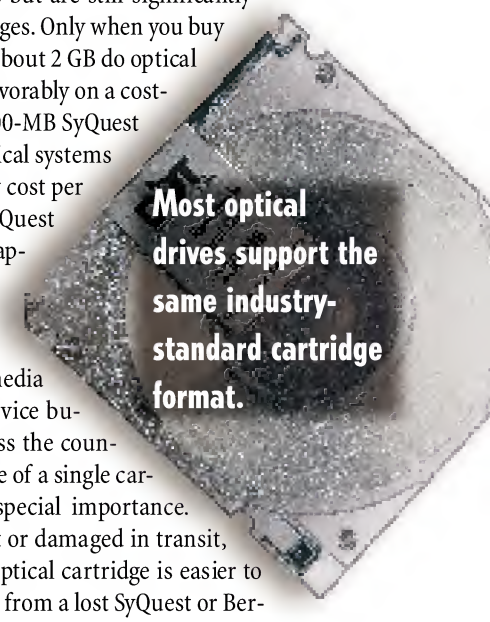
★★★★½ MacProducts Magic SyQuest 200	⊕	⊕	●	●
★★★★½ Spin SyQuest 200	⊕	⊕	●	●
★★★★ ClubMac SyQuest 200	⊕	●	●	●
★★★★ Mac Zone Performantz 200MB Removable	⊕	●	●	●
★★★½ La Cie ZFP SyQuest 200MB Removable Drive	●	⊕	●	●
★★★½ MacConnection MDS SyQuest 200	●	⊕	●	●
★★★½ MacWarehouse PowerUser 200MB SyQuest Drive	●	●	●	●
★★★½ MASS Microsystems DataPak 5.25" Removable	●	●	●	●
★★★½ MaxConcept LP-SQ200C	●	⊕	●	●
★★★½ Microtech RS 200	●	⊕	●	●
★★★½ Mirror 200 MB SyQuest	●	●	●	●
★★★½ Prima PDQ Classic 200 MB	●	⊕	●	●
★★★ FWB HammerDisk PE 200	⊖	●	●	●
★★★ Liberty 115 Series 200MB SyQuest	⊖	●	⊕	⊖

Iomega. All SyQuest cartridges are manufactured by SyQuest or its licensees, and all Bernoulli cartridges are made by Iomega.)

The OCEAN Vista V256 uses a mechanism that formats a 3.5-inch optical cartridge to hold 256 MB of data. This drive can read from and write to 128-MB cartridges but cannot read from the 230-MB cartridges most other 3.5-inch optical drives use.

A Cartridge to Count On

For most Mac users, the price you pay for the convenience of removable storage has more to do with the cost and reliability of the cartridges you buy than with the initial price of a removable-media drive. Perhaps the most important thing to consider before you buy a removable-media drive is the storage capacity you'll need — not just now, but over the life of the drive — and what you're willing to pay for it. A SyQuest or Bernoulli drive is about half the price of an optical drive. But at $45 each, optical cartridges are half the price of 200-MB SyQuest and 230-MB Bernoulli cartridges. At $80 apiece, 270-MB SyQuest cartridges are a little cheaper than 200-MB ones but are still significantly costlier than optical cartridges. Only when you buy enough cartridges to total about 2 GB do optical systems start to compare favorably on a cost-per-megabyte basis with 200-MB SyQuest and Bernoulli systems. Optical systems don't begin to equal the low cost per megabyte of 270-MB SyQuest systems until you reach approximately 5 MB's worth of cartridges, however (see figure 1).



If you frequently send media through the mail — to service bureaus or to colleagues across the country, for example — the price of a single cartridge begins to take on special importance. Packages can easily get lost or damaged in transit, and the cost of a missing optical cartridge is easier to take than the bite you'll feel from a lost SyQuest or Bernoulli cartridge.

If you do plan to move cartridges from place to place — say, send them through the mail or via messenger — or if you plan to keep them around for a long time, you may be concerned about durability. A while back, we investigated the durability of various types of cartridges (see "Tough Enough?" July '94, page 143). We dropped them; exposed them to extreme heat, cold, and humidity; mailed them across the U.S.; and sent them through airport security systems — and they all survived, with their data intact. Our testing didn't verify the lifetime guarantee many optical-cartridge makers offer or even the five-year guarantee that SyQuest and Iomega each offer on their media, but we did conclude that removable media are well suited to the stresses of office use.

Nevertheless, optical cartridges offer at least one data-integrity advantage over their magnetic competitors. Magnetic cartridges are more vulnerable to contamination by dust and fingerprints than are optical ones. Because the read/write heads of a magnetic drive travel only millimeters from the surface of the disk, a fingerprint looms like a mountain on the disk's surface and can cause a *head crash* that irreparably damages the cartridge.

Optical-drive lasers operate at a far greater distance, so the worst a fingerprint can do is interfere with the data-transfer process until you open the shutter and clean the disc's surface. (You cannot clean magnetic disks.) SyQuest has tried to diminish the possibility of contamination by making it difficult to open the spring-loaded metal cover that conceals the disk inside its 3.5-inch cartridge. Similar covers on 5.25-inch magnetic media can be opened more easily, exposing the disks to contamination.

	PRICE/ PERFORMANCE	CUSTOMER SERVICE	CONSTRUCTION AND DESIGN	DOCUMENTATION AND SOFTWARE
200-MB SYQUEST DRIVES, CONTINUED				
MicroNet Advantage 200 Removable	⊖	●	●	●
PLI Infinity 200 Turbo	⊖	●	●	⊖
230-MB BERNOULLI DRIVE				
Iomega Bernoulli 230 Transportable	●	⊕	●	●
230-MB AND 256-MB MAGNETO-OPTICAL DRIVES				
Pinnacle Micro Tahoe 230	⊕	●	⊕	●
This small, portable optical drive ($999 list, $940 street) offers good speed at a fair price. The Tahoe 230 can run off batteries as well as from a standard AC outlet.				
APS 230MO	●	⊕	⊕	●
ClubMac Olympus 230MO	⊕	●	●	●
Dynatek ROS 230	●	⊕	●	●
La Cie Joule 230MB Optical Drive	●	⊕	●	●
Liberty 50 Series 230 Rewritable Optical	●	●	⊕	⊖
MicroNet Advantage 230MB Optical	●	●	●	●
Mirror 230 MB Optical Drive	●	●	●	●
OCEAN Vista V256	⊕	●	●	⊖
Olympus Deltis 230 MO/Mac	●	●	●	⊕
Optima MiniPak 230 MO	●	●	●	●
Prima PDQ Portable 230 MO	●	⊕	●	●
ADPI RO230 One for All Rewritable Optical	⊖	⊕	●	●
Fujitsu DynaMO 230	●	●	⊖	●
PLI Infinity Optical 230	●	●	●	⊖

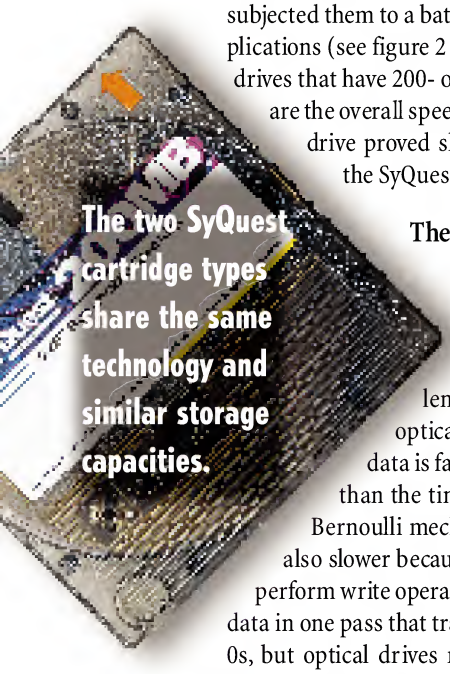
Listing is alphabetical within groups of equal mouse ratings.

Matching Speed to Need

When it comes to performance, no removable-media drive can match the speed of a hard drive. If you need the speed of a hard drive and the convenience of removability, get a hard drive with a rugged, compact case or a removable-hard-drive subsystem (see "Choosing the Right Removable," November '93, page 106). But if the ability to transport data is your main requirement, speed takes a backseat to price and reliability.

The best strategy for using a removable-media drive is to keep your working files on your hard disk and move less frequently used data to cartridges as necessary. Therefore, if you're a graphics professional, use your fastest storage device — your hard drive — to do all of your Photoshop and DTP work. And when you need to move data to another site, such as a service bureau, move the files to cartridges.

Of course, some of us simply don't have enough room on our hard disks to work this way. If you need to keep working files on a cartridge, the speed of the removable-media drive is a more important consideration. To see how the drives we tested stack up in terms of speed, we subjected them to a battery of tests with real-world applications (see figure 2 for the results of our tests). The drives that have 200- or 270-MB SyQuest mechanisms are the overall speed leaders. The Iomega Bernoulli drive proved slightly slower in our tests than the SyQuest ones.


The two SyQuest cartridge types share the same technology and similar storage capacities.

The Optical Slowdown

The drives with optical mechanisms were generally the slowest in our tests, for several reasons. For starters, the lens assembly that travels over an optical disc's surface to read and write data is far heavier (and therefore slower) than the tiny magnetic heads SyQuest and Bernoulli mechanisms use. Optical drives are also slower because of the manner in which they perform write operations: Magnetic drives can write data in one pass that transfers data in a burst of 1s and 0s, but optical drives require a two-pass process: an *erase pass* that resets target domains to 0s, followed by a *write pass* that fills in the 1s.

One more reason for optical drives' relative slowness is their default usage of a *write-verification* mode: This safety operation entails reading back a block of data to ensure its integrity after it's been written, which adds an extra pass to every write operation, exacting a significant speed penalty. (CharisMac's Anubis Turbo MO driver, which ships with the Fujitsu DynaMO 230, can shave as much as one-third of the time off the writing process by preerasing unused portions of the disc while the drive is idle. The Anubis Turbo MO driver, which works with other optical drives as well, is available separately from CharisMac for a list price of $149.)

SyQuest and Bernoulli drives can be made to perform write verification too, but write verification is turned off in their default settings to maximize speed. If you enable write verification on a Bernoulli or SyQuest drive, its speed drops by about half, although the drive is still faster than an optical drive.

A Question of Compatibility

If you send files to service bureaus or share them with collaborators or if you have an older removable-media drive, compatibility concerns should factor into your buying decision.

The SyQuest 5.25-inch-cartridge format is the de facto standard in the publishing world. The 200-MB SyQuest drives we tested build on this standard, with their ability to read from and write to (but not format) older 44- and 88-MB cartridges. (The converse is not true, however: Older 44- and 88-MB drives don't support 200-MB cartridges.) We expect most service bureaus to begin using the 200-MB drives soon, but check with yours before you buy one.

Less pervasive in the service-bureau world are 3.5-inch SyQuest and optical drives and 5.25-inch Bernoulli drives. Bernoulli drives are the predominant removable-media option in the PC world, which makes them a logical choice if you need to share data with users of non-Mac systems. Optical drives are gaining popularity with printers and publishers. The 270-MB SyQuest drives can read from and write to 105-MB SyQuest cartridges, and the Iomega Bernoulli 230 Transportable can read from and write to all previous-generation Bernoulli cartridges. The 230-MB optical drives can read from and write to the 128-MB cartridges used in the previous generation of optical drives.

Note that unless you're using an optical cartridge, even if the new, higher-capacity drive you want can read data from and write it to older, lower-capacity cartridges, you pay a substantial speed penalty when you use a higher-capacity drive to write to older, lower-capacity cartridges: In our tests, a 200-MB SyQuest drive took more than five times as long to write to an 88-MB cartridge as it did to a 200-MB one and Bernoulli 230-MB and SyQuest 270-MB drives took nearly three times as long when writing to 150-MB and 105-MB cartridges, respectively, than when writing to their native-capacity cartridges. The lower the capacity of the older cartridges, the more dramatic this speed hit became.

Choosing Your Drive

Once you've settled on a technology that meets your price, reliability, and speed criteria, how do you zero in on the drive that's best for you? Focus on case design and construction, software features, and the quality of the vendor's tech support.

Among drives based on the same technology, the

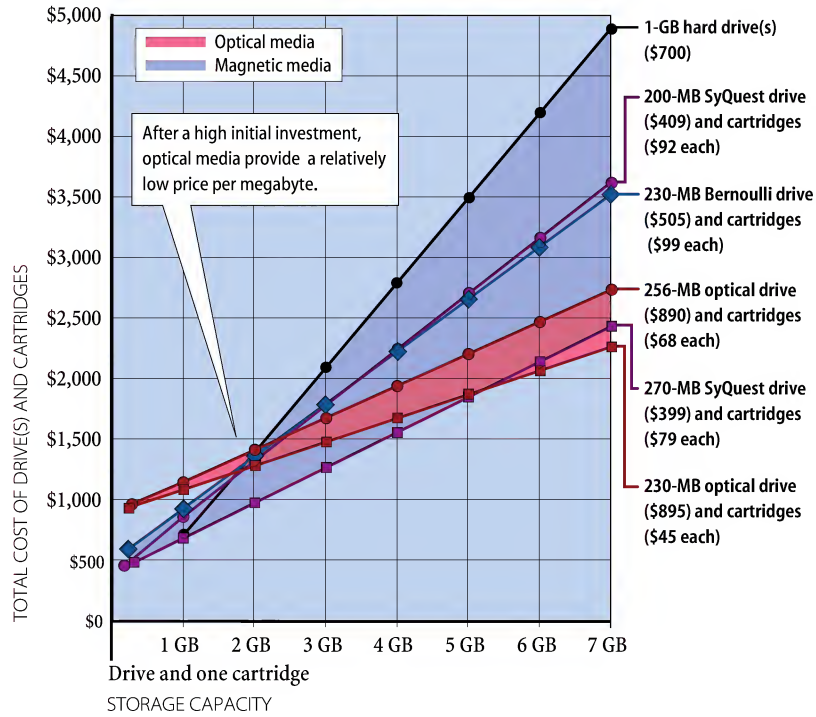
figure 1

MacUser ZD LABS

Cost per Megabyte / your best removable-media buy

SyQuest and Bernoulli cartridges can cost twice as much as optical ones. Optical-drive prices, though, are twice those of magnetic-media drives. As you purchase more cartridges, your cost of ownership shifts in favor of 270-MB SyQuest and optical technology. We added the cost of media to the purchase price of the least expensive SyQuest (200-MB and 270-MB), Bernoulli, and optical drives in this report. We also plotted the cost of using hard drives to transport extremely large digital-video and prepress files to service bureaus or production facilities.

A SyQuest system is cheaper than an optical one for less than 2 GB (seven to ten cartridges) of storage. If you need 5 GB's worth, a 270-MB SyQuest system is still less expensive than an optical system. Below 2 GB, a large hard drive costs less than a removable-media drive and the cartridges needed to equal that storage capacity. Beyond 2 GB, all removable-media options beat hard drives.



most significant differences we noticed involved case design. Most of the 5.25-inch drives have mechanisms housed in horizontal, *zero-footprint* cases — so named for their ability to sit beneath the old compact Macs without occupying any additional desk space. (Iomega puts a twist on this time-tested design with a foldout carrying handle built in to its Bernoulli 230 Transportable drive.) The 3.5-inch SyQuest and optical drives are smaller than the zero-footprint drives, and some can be placed either horizontally or vertically on your desk. Some drives include extra AC outlets that can reduce power-strip tangles and have helpful indicator LEDs that inform you when the drive is on and when your Mac is accessing the disk.

Several drives boast extraordinary case designs. La Cie's sleek Joule case, for example, is part of a line of modular storage devices that includes hard drives, tape drives, and 3.5-inch removable-media drives. Your first Joule device must include a Joule base, which contains a power supply and a Joule cap containing a terminator and a built-in SCSI cable. You can add more devices to the stack for a relatively low cost, because they don't require a power supply or termination. Liberty's 270-MB SyQuest and 230-MB optical drives are outstanding not only for their compact size but also for their ability to run on built-in rechargeable batteries. The Pinnacle Micro Tahoe 230 is also designed for portability and is available with an optional rechargeable, external battery pack and carrying case. Taking your drive with you can end compatibility worries, if a colleague doesn't use the same removable-media technology you do.

Drives with a Lot in Common

Except for aesthetic differences, the drives we reviewed were very similar. Each ships with a cable that lets you connect it directly to your desktop Mac's 25-pin SCSI connector. Only Microtech ships its drives with a second cable, which lets you daisy-chain a Microtech drive to another 50-pin SCSI device. The Iomega Bernoulli 230 Transportable comes with a 25-to-50-pin adapter that allows its cable to be used at the beginning or in the middle of a SCSI chain.

Most drives use standard external terminators, although a few — such as those from Iomega and PLI — have a handy switch you can flip to turn termination on or off. Some drives, such as those from APS and La Cie, go a step further by having *active* termination, which intelligently cancels electrical noise on the SCSI bus.

All the drives we tested come with driver software that lets you create multiple partitions. This can come in handy if you need to store confidential files on the same cartridge as shared files — you can password-protect one partition while leaving others accessible.

The Olympus Deltis 230 MO/Mac's software (Software Architects' Formatter Five) lets you create PC and Mac partitions — a convenience if you share data with

figure 2

MacUser ZD LABS

Scrutinizing Removable-Media Drives / how they compare

It's a close race among SyQuest, Bernoulli, and magneto-optical drives. Many drives sport the same features, and price gaps are narrowing. If you need storage capacities of under 5 GB, SyQuest and Bernoulli drives are most cost-effective. For larger capacities, optical drives begin to be the best value in cost per megabyte.

As for speed, the SyQuest drives were the overall leaders, with the Iomega Bernoulli 230 Transportable close behind. To find out how quickly the drives run in a variety of situations, we performed six tests. First, we copied an 18-MB file from a hard disk to a cartridge to give us an indication of how the drives perform as backup or archival devices. Next, we opened a 10-MB Photoshop file to find out how quickly the drives read a large contiguous file (this test is a good indicator of how well the drives perform for playing back video or audio data). We saved the same file to find out how quickly the drives write a contiguous file.

We also saved a PageMaker file that consisted of several elements — text, photographic images, and graphics — to find out how quickly the drives perform when they have to both find and write data. By sorting a database in 4th Dimension, we were able to find out how quickly the drives find and read randomly located data. Finally, we ran MacBench 1.1, our standard testing tool (available from ZiffNet/Mac), on each drive to determine each drive's overall speed for a variety of common productivity tasks. The drives in these charts are ranked in order of overall performance for each category.

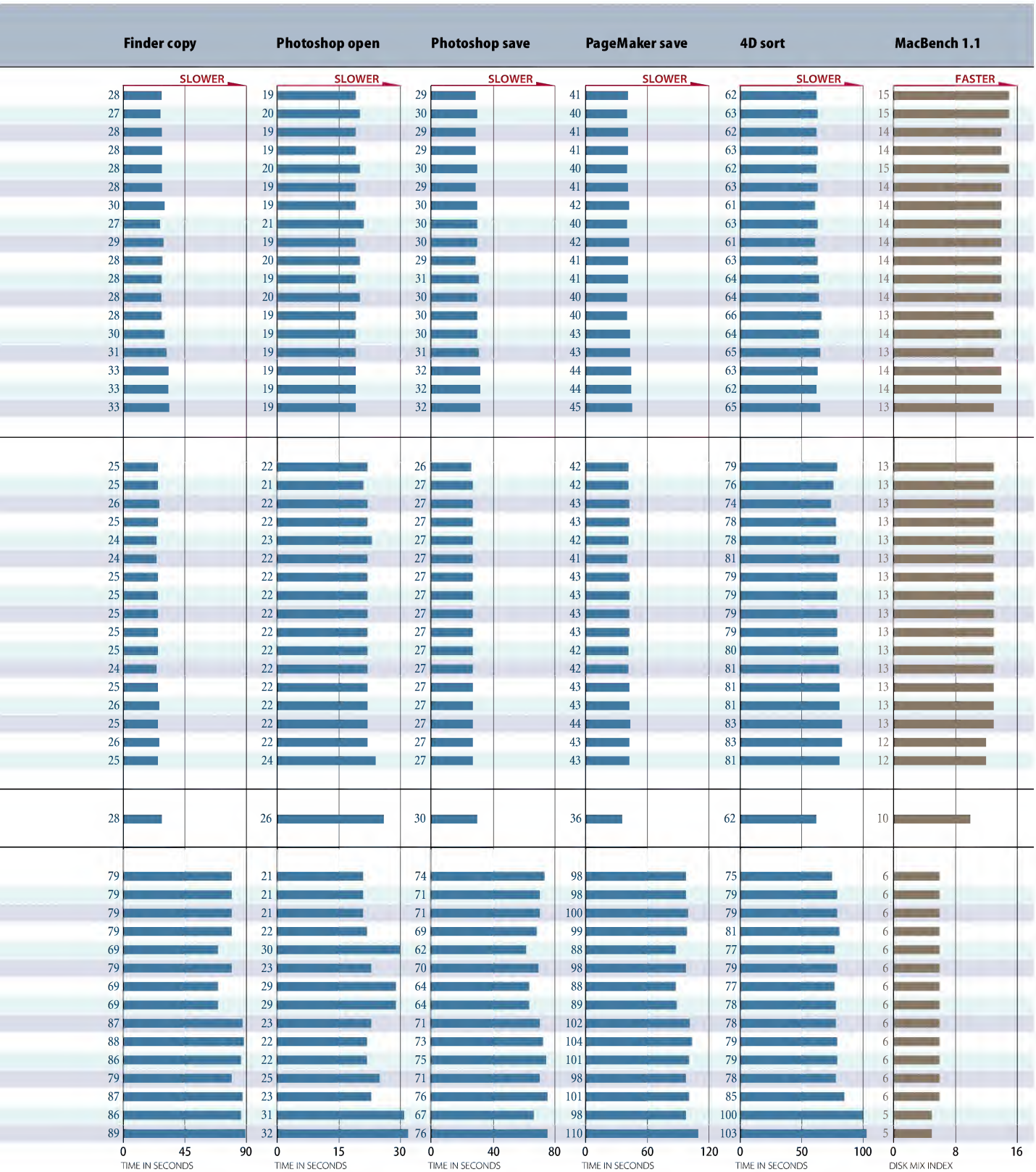
	List price	Street price	Switchable termination	Active termination	Has extra AC outlets	Money-back guarantee	Toll-free tech support	Warranty
270-MB SYQUEST DRIVES								
✓ MacProducts Magic SyQuest 270	$399	$399	●	●	●	●	●	2 years
Prima PDQ Portable 270 MB	$688	$580				●	●	1 year
Spin SyQuest 270	$429	$429				●	●	2 years
Mac Zone Performantz 270MB Removable	$488	$488				●	●	2 years
Dynatek RMD 270	$714	$620		●	●	*	●	2 years
MaxConcept SL-SQ270C	$645	$570		●		●		2 years
APS SQ 3270	$529	$529	●	●		●	●	2 years
La Cie Joule 270MB Removable Drive	$569	$569	●	●	●	●	●	1 year
Microtech RS 270	$627	$590				●	●	2 years
MicroNet Advantage 270 Removable	$609	$570		●				1 year
Mirror 270 MB SyQuest	$599	$599		●		●	●	2 years
FWB HammerDisk PE 250	$829	$650		●				2 years
MASS Microsystems DataPak 3.5" Removable	$764	$580		●			●	3 years
MacWarehouse PowerUser 270MB SyQuest Drive	$579	$579			●	●	●	2 years
Liberty 50 Series 270 SyQuest	$699	$699	●	●		●		1 year
PLI Infinity 270 Turbo	$651	$600	●			●	●	1 year
ClubMac SyQuest 270	$489	$489	●	●		●		2 years
MacConnection MDS SyQuest 270	$539	$539				●	●	2 years
200-MB SYQUEST DRIVES								
ClubMac SyQuest 200	$488	$488	●	●		●		2 years
MacProducts Magic SyQuest 200	$449	$449	●	●	●	●	●	2 years
La Cie ZFP SyQuest 200MB Removable Drive	$599	$599	●†	●†	●	●	●	1 year
MaxConcept LP-SQ200C	$749	$600		●		●		2 years
Prima PDQ Classic 200 MB	$719	$610				●	●	1 year
MASS Microsystems DataPak 5.25" Removable	$785	$610		●	●		●	3 years
Mac Zone Performantz 200MB Removable	$488	$488			●	●	●	2 years
Spin SyQuest 200	$409	$409	●	●	●	●	●	2 years
PLI Infinity 200 Turbo	$775	$680	●			●	●	2 years
✓ APS SQ 5200	$499	$499	●	●		●	●	2 years
FWB HammerDisk PE 200	$849	$700		●				2 years
Mirror 200 MB SyQuest	$599	$599			●	●	●	2 years
Liberty 115 Series 200MB SyQuest	$699	$699	●	●		●		1 year
MacConnection MDS SyQuest 200	$529	$529			●	●	●	2 years
Microtech RS 200	$655	$600			●	●	●	2 years
MacWarehouse PowerUser 200MB SyQuest Drive	$579	$579			●	●	●	2 years
MicroNet Advantage 200 Removable	$719	$700		●				1 year
230-MB BERNOULLI DRIVE								
Iomega Bernoulli 230 Transportable	$582	$500	●			●	●	2 years
230-MB AND 256-MB MAGNETO-OPTICAL DRIVES								
Prima PDQ Portable 230 MO	$1,214	$1,020				●	●	1 year
Liberty 50 Series 230 Rewritable Optical	$1,099	$1,099	●	●		●		1 year
Dynatek ROS 230	$1,099	$1,000		●	●	*	●	1 year
PLI Infinity Optical 230	$1,298	$1,070	●			●	●	1 year
APS 230MO	$999	$999	●	●		●	●	2 years
MicroNet Advantage 230MB Optical	$1,075	$1,000		●				1 year
ClubMac Olympus 230MO	$895	$895	●	●		●		2 years
Olympus Deltis 230 MO/Mac	$1,195	$1,000	●	●			●	2 years
La Cie Joule 230MB Optical Drive	$1,069	$1,069	●	●	●	●	●	1 year
✓ Pinnacle Micro Tahoe 230	$999	$940				●	●	1 year
Optima MiniPak 230 MO	§	$1,110				●		1 year
Fujitsu DynaMO 230	$1,195	$890	●	●		*		1 year
Mirror 230 MB Optical Drive	$979	$979				●	●	1 year
OCEAN Vista V256	$1,123	$890				●	●	1 year
ADPI RO230 One for All Rewritable Optical	$1,389	$1,389	●†	●†		●	●	1 year

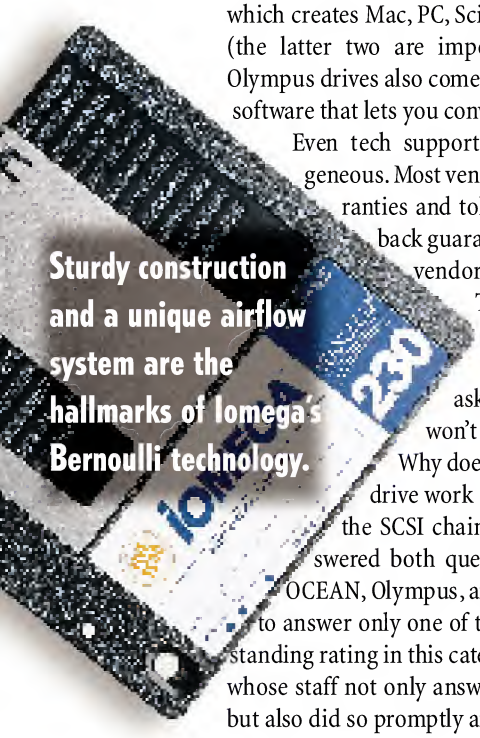
✓ MacUser RECOMMENDS

*Depends on the dealer.

†Optional.

§Optima does not provide list prices.


Finder copy
Photoshop open
Photoshop save
PageMaker save
4D sort
MacBench 1.1
SLOWER
FASTER
TIME IN SECONDS
DISK MIX INDEX
0 45 90
0 15 30
0 40 80
0 60 120
0 50 100
0 8 16



Sturdy construction and a unique airflow system are the hallmarks of Iomega's Bernoulli technology.

people who use other platforms. For about $300 more, you can get the same drive with Formatter Five Pro, which creates Mac, PC, Scitex, and Crosfield partitions (the latter two are important for prepress users). Olympus drives also come with file-format-translation software that lets you convert files between standards.

Even tech support is becoming more homogeneous. Most vendors now offer two-year warranties and toll-free tech support. Money-back guarantees are common; only four vendors do not offer them.

To test each vendors' technical competency, we made two anonymous phone calls, asking typical questions (Why won't the cartridge mount? and Why doesn't an old removable-media drive work since we added a new one to the SCSI chain?). Twenty-one vendors answered both questions correctly; only FWB, OCEAN, Olympus, and Pinnacle Micro were able to answer only one of the two. But we gave an Outstanding rating in this category solely to those vendors whose staff not only answered the questions correctly but also did so promptly and courteously.

The Endgame

All three types of removable-media drives — SyQuest, Bernoulli, and magneto-optical — can meet your needs for data portability. Which type is best for you depends on your budget (for a drive today as well as for additional cartridges tomorrow), your requirements for compatibility with others' systems, drive speed, drive-case design and construction, and "intangibles" such as customer service and tech support.

A 230-MB optical drive costs considerably more than a SyQuest drive. But for those whose storage needs exceed 5 GB, the lower cost of optical cartridges compared to SyQuest media can make an optical system a good investment in the long run. Some users also favor optical media's invulnerability to dust and fingerprints.

The 230-MB Bernoulli drive we tested is a solid product and is compatible with older Bernoulli cartridges, which may be important for users who have already bought into Bernoulli technology. Although Bernoulli drives aren't particularly well accepted among graphics users, they are extremely popular among PC users and might be the best option for those whose Macs are step-children within PC organizations.

Finally, if it boils down to speed, stick with a SyQuest drive. The 270-MB drives are the speediest overall, but the 200-MB drives give them a run for their money and offer the benefit of reading from and writing to older, established 44- and 88-MB cartridges.

Jim Shatz-Akin is a *MacUser* associate editor. ZD Labs project leader David Kison supervised the testing for this report.

MacBench 1.1, the benchmark software used to test the removable-media drives for this report, is available on-line on ZiffNet/Mac. See page 4 for instructions on accessing ZiffNet/Mac.

Directory / vendors of removable-media drives tested

ADPI
Troy, OH
800-758-1041
513-339-2241
513-339-0070 (fax)

APS Technologies
Kansas City, MO
800-233-7550
816-483-6100
816-483-3077 (fax)

ClubMac
Irvine, CA
800-258-2622
714-768-8130
714-768-9354 (fax)

Dynatek Automation Systems
Halifax, NS
Canada
800-461-8855
902-832-3000
902-832-3010 (fax)

Fujitsu Computer Products of America
San Jose, CA
800-626-4686
408-432-6333
408-894-1706 (fax)

FWB
San Francisco, CA
415-474-8055
415-775-2125 (fax)

Iomega
Roy, UT
800-777-6654
801-778-1000
801-778-3450 (fax)

La Cie
Beaverton, OR
800-999-0143
503-520-9000
503-520-9100 (fax)

Liberty Systems
San Jose, CA
408-983-1127
408-243-2885 (fax)

MacConnection
Marlow, NH
800-800-2222
603-446-7711
603-446-7791 (fax)

MacProducts USA
Austin, TX
800-624-9307
512-892-4070
512-892-4455 (fax)

MacWarehouse
Lakewood, NJ
800-255-6227
908-370-4779
908-905-9279 (fax)

The Mac Zone
Bellevue, WA
800-248-0800
206-603-2550
206-603-2500 (fax)

MASS Microsystems
Milpitas, CA
800-522-7970
408-956-5999
408-956-5995 (fax)

MaxConcept
San Diego, CA
619-530-9014
619-530-9032 (fax)

MicroNet Technology
Irvine, CA
714-453-6100
714-453-6101 (fax)

Microtech International
East Haven, CT
800-626-4276
203-468-6223
203-468-6466 (fax)

Mirror Technologies
Edina, MN
800-643-2680
612-830-1549
612-832-5709 (fax)

OCEAN Microsystems
Cypress, CA
800-944-6232
714-898-1340
714-891-8484 (fax)

Olympus Image Systems
Woodbury, NY
800-347-4027
516-364-3000
516-677-1699 (fax)

Optima Technology
Irvine, CA
714-476-0515
714-476-0613 (fax)

Pinnacle Micro
Irvine, CA
800-553-7070
714-727-3300
714-789-3150 (fax)

PLI (Peripheral Land, Inc.)
Fremont, CA
800-788-9440
510-657-2211
510-683-9713 (fax)

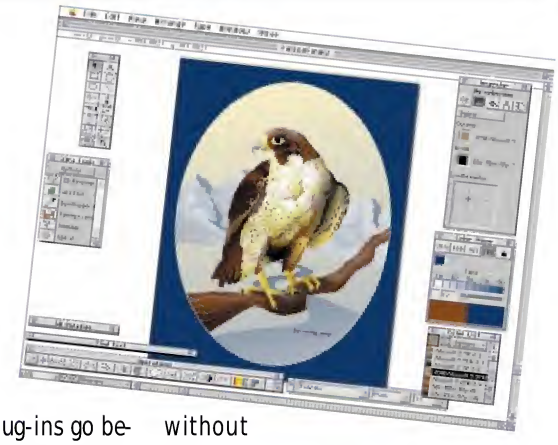
Prima International
Santa Clara, CA
800-737-7462
408-727-2600
408-727-2435 (fax)

Spin Peripherals
Newton Upper Falls, MA
800-466-1200
617-630-1200
617-630-1201 (fax)

ILLUSTRATION /

FreeHand 5.0 Adds Features, Plug-ins

New version ups the ante for Illustrator.



PROFESSIONAL ILLUSTRATORS used to buy both Aldus FreeHand and Adobe Illustrator, because each program had tools the other lacked. Now back in the hands of its developer, Altsys, FreeHand 5.0 may put an end to that purchasing practice, because it supports the Illustrator plug-in format and offers unique tools that Adobe's product currently lacks.

FreeHand's open architecture supports all current Illustrator plug-ins, meaning you can use the Graphic Selection and PathFinder plug-ins from Illustrator on any object in FreeHand 5.0. Its plug-ins go beyond filters, encompassing 30 new tools as well. Among the new tools are a fish-eye tool that distorts selected objects just like a fish-eye lens does and a new eyedropper that picks up color from drawn objects as well as imported TIFF files.

Plug-ins are great, but FreeHand 5.0 also offers a host of features that put it on a par with Illustrator 5.5, including multicolor gradient fills, multiple views of a drawing, objects as guides, and layer-by-layer preview. In addition, Altsys offers an interactive spelling checker; a search-and-replace tool for text; magnification as great as 25,600 percent; and a new Style browser that gives you a handy way to change any feature of an object, such as the fill color, without having to use an individual palette.

Responding to user complaints about certain features having been removed in version 4, Altsys reinstated the Text Editor dialog box, control of spreads and chokes, and a line-weight pop-up menu. It also made the interface configurable.

The feature set alone makes FreeHand 5.0 an enticing upgrade. Upgrade pricing had not been set at press time, but the retail price remains $595. 415-252-2000.

Note: At press time, Altsys agreed to merge with Macromedia, giving FreeHand the distinction of being the only major Mac software product to be published by three major companies — Aldus, Adobe, and Macromedia. / Sean J. Safreed

Prepress-Quality Scans for Desktop Publishers

PREPRESS SHOPS are where you find most PixelCraft scanners. Now the company has decided to bring high-end features to a low-cost scanner, the Pro Imager 4000.

The $2,995 Pro Imager 4000 is a boon for designers who work with hard copy as well as transparencies. It scans reflective art as large as 8.3 x 11.7 inches and transmissive originals up to 8 x 10 inches. The Pro Imager captures 10 bits of data per color in a single pass and boasts a resolution of 600 x 2,400 dpi (with a top resolution of 2,400 x 2,400 dpi through software interpolation).



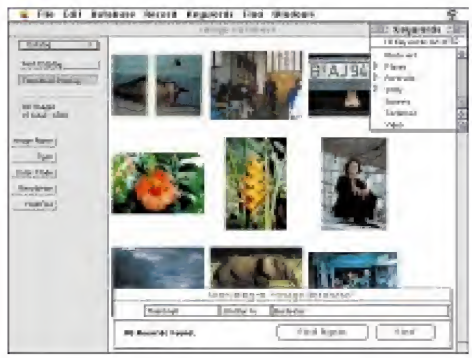
A key feature of the Pro Imager 4000 is its bundled software. PixelCraft's scanning and color-correction software is some of the best in the business, and the Pro Imager 4000 ships with the same package as its big brother, the $12,995 Pro Imager 8000. QuickScan lets you preview, crop, and scale images before scanning; you can also set it to batch-scan a series of images. Color Access converts RGB data into CMYK data for color correction in the program. Both programs also work as plug-ins to Adobe Photoshop. 800-933-0330 or 510-562-2480. / Pamela Pfiffner

IMAGE DATABASES /

Drag-and-Drop Image Cataloging

SYSTEM 7.5 INTEGRATES numerous prior enhancements to the system, such as AppleScript and Macintosh Drag and Drop, into one unified release. Cumulus PowerPro 2.1, from Canto Software, exploits both of these technologies to make image cataloging easier.

AppleScript, Apple's scripting language, automates tasks within an application and across applications that support it. Cumulus ships with a variety of sample scripts that show you how to integrate images from any catalog into your page-layout program automatically. For instance, with a sample script included with Cumulus, you can use your photos to produce a contact sheet in PageMaker.



Cumulus also allows you to import images into QuarkXPress through Drag and Drop. For example, dragging a picture from the Cumulus window to an open layout in QuarkXPress automatically creates a picture box and drops in a photo. Cumulus extends the drag-and-drop metaphor a step further by turning any picture or piece of text into a drag-and-drop element. So the tedious chore of assigning keywords can become a one-step operation; all you have to do is drag keywords from a list into any database field.

Besides running native on the Power Mac, this version has an improved client/server architecture that speeds searches. Cumulus PowerLite — a single-user version — lists for $199; the five-user client/server PowerPro version is $1,495. 415-431-6871. / SJS

Image Editing Without Photoshop

ALTERNATIVES TO PHOTOSHOP abound these days. If you work with photos, check out Apple's PhotoFlash 2.0 or Microspot's PhotoFix.

PhotoFlash 2.0. Not an image-editing application per se, PhotoFlash makes it simple to put pictures into any document. The new version allows multiple open catalogs and drag-and-drop among catalogs, and it offers more AppleScript features than its predecessor did. It additionally has a nice search feature that looks at a picture and identifies matches by appearance, so, for instance, you can locate all the pictures in a catalog that look like a sunset.



PhotoFlash now offers rudimentary color correction through a new color-correction filter, although it doesn't let you edit CMYK images. It also comes with new scripts for placing photos in FileMaker Pro and Word 6.0 and a CD-ROM of images from Clement Mok Designs. Apple has lowered the price to $129; upgrade, $39. 408-996-1010.

PhotoFix. This new $250 program offers image cataloging, via Kudo's Image Browser. It also includes multicolor gradients, filters for blur and sharpen, and advanced color-correction capabilities. PhotoFix enables you to use Photoshop plug-in filters and switch among folders instantly.

The program includes a High Quality Printing feature, which allows you to get a better color match between your printer and your monitor. In addition, an extended color picker lets you create your own color picker by selecting a range of colors from an open image. You can't work in CMYK mode, although you can export images as CMYK files. 800-622-7568 or 408-253-2000. / Jason Snell

GRAPHIC TOOLS /

Polish Up Your Granite

WOOD AND MARBLE backgrounds make an elegant statement in any presentation. Rather than purchase a CD-ROM of static textures, you can use texture-making software to create your own. There's been a slew of texture generators recently, including two new programs from Adobe and Virtus.

Adobe TextureMaker 1.0 focuses on unique natural textures. It ships with more than 100 templates in categories such as marble, wood, granite, and fabric. All the textures use a layering method that uses prebuilt texture generators and filters to achieve a natural look. For instance, you can use a granite generator in combination with a noise filter in order to create stone. When you apply the custom lighting controls and engraving effects of TextureMaker, you can render a professional-looking texture. You can use Photoshop-compatible filters with TextureMaker too, to provide an endless variety of looks. $199. 206-622-5500.



Alien Skin, from Virtus, lacks TextureMaker's easy customization, but it produces otherworldly textures with one-button simplicity. A click of the texture-generator button produces several variations on the currently selected texture. Drag-and-drop swatches allow you to save textures in custom libraries. Alien Skin offers hundreds of textures and is available as either a standalone application or as a Photoshop plug-in. $99. 919-467-9700.

You might recognize Alien Skin as the name of a company. Alien Skin Software wrote Virtus' Alien Skin application, and the company additionally publishes a set of Photoshop filters called The Black Box. The filters are Power Mac-native and include such operations as automatic creation of drop shadows and instantaneous text embossing. $89. 919-832-4124. / SJS

Where to Find Hot Type

LOOKING FOR SOME FUNKY FONTS? Then order *FontBook,* FontShop International's catalog. Founded by Erik Spiekermann in Berlin six years ago, FontShop distributes cutting-edge typefaces from small foundries such as Emigre, The Font Bureau, and Carter & Cone as well as mainstream fonts from the usual suspects. FontShop's exclusive FontFont collection offers fonts created by such enfants terribles of European type design as Neville Brody, Erik van Bloklund, Just van Rossum, and Pierre di Sciullo. *FontBook* costs $39, but it's worth it. Call FontShop's new U.S. office, in Chicago, at 800-897-3872 or 312-360-1990. ✧ For a dose of irreverence along with your fonts, try a package from House Industries. This design shop sells witty, eponymously named font families (Doghouse, Housemaid, and so on) in ultra-hip packaging. Order ten faces ($150), and get a killer T-shirt. (Call for the new catalog featuring Housewear, a complete line of clothing.) 800-888-4390 or 302-888-1218. ✧ Linotype-Hell may be one of the oldest type foundries around, but its new Face2Face collection ($120) is anything but stodgy. Face2Face includes eight original display fonts with a decidedly modern bent packaged with an eye-popping poster and a matching T-shirt. 800-799-4922 or 516-434-2000. ✧ Less avant-garde but just as fresh is Eaglefeather, a new font from Agfa



EAGLEFEATHER BASED O
OF FRANK LLOYD WRIGH
EAGLEFEATHE

based on the lettering of that 20th-century radical Frank Lloyd Wright. Designed by David Siegel (the man behind Adobe's hugely popular Tekton), Eaglefeather is sanctioned by the Wright Foundation and is sold exclusively through Agfa. The font has 15 faces with formal, informal, and small-cap styles. $45 each, $345 for all 15. 800-424-8973 or 415-431-6871. / PP

PAGE LAYOUT / BY KATHLEEN TINKEL

Pumping Up PageMaker

Left in the dust by other plug-in technologies, Additions are growing up, filling out, and ready to add muscle to Adobe's page-layout workhorse.

PAGEMAKER'S TREK on the comeback trail has been long and frustrating. Despite real advances, the program has been criticized for its apparent inability to cater to power users on the one hand and to the niche marketplace on the other. No program can be all things to all users, but PageMaker is extending its reach with clever add-ons. Like Photoshop's plug-ins and QuarkXPress' XTensions, PageMaker's Additions technology can turn a slow-and-steady workhorse into a rocket ship.

PageMaker's Additions effort got off to a faltering start. Developers were not given the keys to the kingdom — access to PageMaker's core code — but rather had to fumble around outside the program, automating functions users could already perform manually. In contrast, Quark's XTensions use a technology that lets them send software hooks deep into QuarkXPress' heart to drive the program into completely new territory (see "XTraordinary XTensions," November '94, page 109).

But as the Additions technology evolved, Aldus worked one-on-one with developers, giving them deeper access to PageMaker functions when necessary. The Additions technology is still fairly young, but we're beginning to see both highly focused utilities — such as the small, inexpensive Additions from Mapsoft that automate a single chore (Style Report, for example, prints out an exhaustive list of text styles, with complete definitions) — as well as high-end production workhorses, such as Integrated Software's $2,000 Ad Maker, which turns PageMaker into an effective classified-ad-production tool.

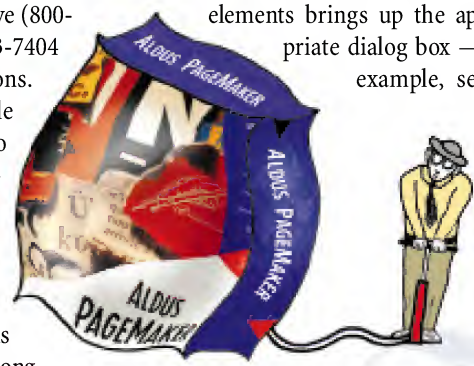
It's still early for Additions, but if anything, the technology's future looks rosier now that Adobe has acquired Aldus. Adobe has announced plans to strengthen and expand the Additions effort by encouraging developers of plug-ins for Photoshop and Illustrator to participate. In the meantime, most users will find useful tools among the current crop, some of which we explore here.

The Aldus Developers Cooperative (800-685-3547 or 206-343-4221; 206-233-7404 [fax]) sells most of these Additions. Some of them may also be available from the developers, and one or two — including Extensis' PageTools — are sold through software retail channels.

SmartAlign, Layout Grids, CleanSweep, and DisBatch. All of Zephyr Design's Additions ease bottlenecks and speed up work flow. Among them, SmartAlign ($89) makes up for one of PageMaker's more irritating shortcomings by letting you automatically align or distribute objects by edges or centers. Layout Grids ($89) makes the grid and guide situation more rational, so it is easier to position guides. You can save your setups and apply them to other pages and even to other files. SmartAlign, Layout Grids, and CleanSweep are offered in the Zephyr Essentials package, which costs $149.

DisBatch and CleanSweep are batch processors. CleanSweep ($49) opens PageMaker files from a previous version and converts them to version 4 or 5 (it can run under PageMaker 4.2, in case you need to upgrade version 3 files). DisBatch ($99) runs scripts and can perform almost unlimited operations on PageMaker files — that is, if you can write scripts in PageMaker's scripting language. The DisBatch package includes a helpful booklet, *Script Addendum,* along with seven useful scripts. Adobe sells a book called *Script Language Guide* to help you master PageMaker's scripting language.

Zephyr's Specs ($199), which should be shipping by the time you read this, is a superlibrary in which you can store sets of mixed page elements or styles for use later or elsewhere. Double-clicking on any of the elements brings up the appropriate dialog box — for example, selecting a type item brings up the Type Specifications dialog box.



Zephyr Design, Seattle, WA; 206-324-0292; 206-324-0995 (fax).

PageTools. A breathtaking $129 collection of new functions and new iconic access to existing functions in both PageMaker and its Additions, PageTools is an irresistible product. PageTools' icon bar lets you move regularly used but hard-to-access commands into plain sight. Although PageTools' default icon bar can be confusing, you can customize it by adding or removing as many icons as you like. In fact, it's a good idea to remove

rarely used icons from the icon bar and then add icons for more-common functions as you use them. The ability to place hidden-away functions within reach is just one of PageTools' virtues — it has many more strengths than can be detailed in this space. For more information on PageTools, see the review in the January '95 issue, page 61.

Extensis, Portland, OR; 503-274-2020; 503-274-0530 (fax).

ScanTastic-ps. This $99 collection of tools includes an Addition, an XTension, a plug-in, and some DAs that let you scan images directly into PageMaker as well as into QuarkXPress and Adobe Photoshop. (A new version in the form of a single extension is slated for release by the time you read this.) ScanTastic-ps doesn't include a straightening tool, nor does it give you the option of applying PageMaker's built-in compression to scans before import, but it's relatively fast and gives you control over resolution, scale, brightness, and contrast.

ScanTastic-ps' compact scan-control dialog box is also a surprisingly good tool for introducing the complexities of scanning to a novice. In fact, the program's small manual offers one of the best brief explanations of halftoning and scanning resolution available and includes a useful table of output line frequencies with the appropriate scanning rates.

Second Glance Software, Laguna Hills, CA; 714-855-2331; 714-586-0930 (fax).

Style Report. This obsessive $29 single-task Addition is useful for anyone who needs to record every jot and tittle of a PageMaker file's styles. Style Report reads a document and then creates a PageMaker file containing a formatted listing of all the details, from style name, to type settings (including subordinate settings for super/subscripts and the like), to hyphenation-and-justification settings, to space before-and-after.

If anything, Style Report goes too far — it would be more useful if you could specify which settings you care about to avoid amassing unwanted data. It would also be helpful if you could ask for an ASCII file instead of a formatted PageMaker document.

Mapsoft Computer Services, Newbury, Berkshire, UK; 011-44-635-43-855; 011-44-635-550-097 (fax).

Fræmz, Arrowz, and Starz. These simple Additions ($39 each) provide easy access to borders, star shapes, and arrows — scrolling menus offer a reasonable variety of choices and styles. For the arrows and stars, there are also options for line weight, color, head and tail shape for the arrow, number and style of points for the stars, and whether the shapes are outlined or filled. The arrows and stars are vector graphics, stored in a PICT file.

The Fræmz Addition (three libraries sold for $99 per volume or as a bundle for $207) is actually a series of libraries of preformed borders useful for ads, coupons, and certificates. The interface is a bit odd — you create a throwaway rectangle, select it, and then activate Fræmz. The border fits itself to the selected box, which you can then throw away.

Shadetree Marketing, Phoenix, AZ; 602-279-3713; 602-279-1874 (fax).

TrapMaker. The domain of expensive applications such as Adobe's TrapWise, trapping comes to PageMaker with TrapMaker ($79). Trapping is the process of adjusting colored objects on a page to compensate for the misregistration that can occur in offset printing. Depending on the relationships between adjacent colors, trapping software slightly expands backgrounds (chokes) or objects (spreads) to make unobtrusive overlaps that prevent distracting slivers of blank paper from showing through.

An answer to the autotrapping functionality built in to QuarkXPress 3.2, TrapMaker is elegant and effective for simple chokes and spreads, and it goes the competition one better in that it can trap parts of objects (stopping when an object passes from a colored background out onto blank paper, for example) as well as trap type effectively.

Adobe Systems, Seattle, WA; 800-628-2320 or 206-622-5500.

PDF Navigator. This single-minded $69 Addition radically eases the process of turning PageMaker files into Adobe Acrobat interactive portable documents. PDF Navigator translates PageMaker's indexing markers and tables of contents into PDF (Portable Document Format) bookmarks and hypertext links, taking a great deal of the tedium out of this task. (Using PDF Navigator requires Acrobat Distiller.)

XMan, San Francisco, CA; 415-626-3359.

Kathleen Tinkel, who writes frequently about desktop publishing for this and other publications, wrote about QuarkXPress XTensions in MacUser's *November '94 issue.*

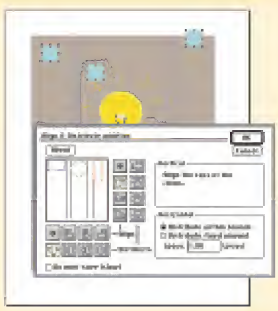


figure 1 / **SmartAlign** should be built in to PageMaker, since aligning and centering objects is an essential part of page layout. The well-illustrated dialog box gives clear choices.



figure 2 / **ScanTastic-ps'** compact spec box lets you control resolution, halftone frequency, and other scanning essentials from within PageMaker.

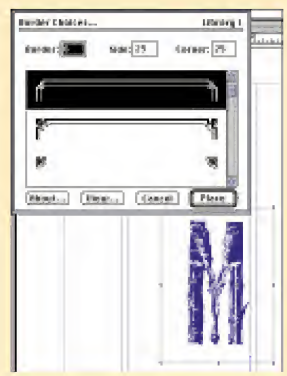


figure 3 / **Fraemz** is a straightforward time-saver for anyone who needs to use borders to embellish ads, coupons, or certificates.

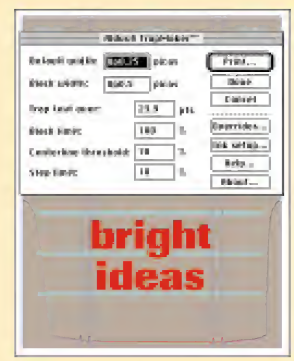


figure 4 / **TrapMaker** has a deceptively simple dialog box that lets you apply simple chokes and spreads on an object level as well as by color.

GRAPHICS HOW-TO / BY JANET ASHFORD



Blends Versus Gradients

What's the difference between a blend and a gradient? An artist uses each to good effect.

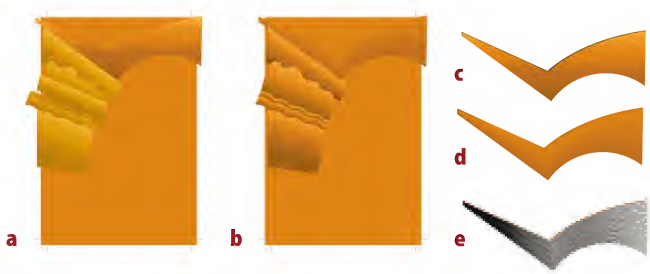
THIS STYLIZED MONOCHROMATIC illustration of Los Angeles circa 1930 by New York illustrator Daniel Pelavin consists of layers of overlapping shapes, most of which are defined by carefully crafted blends in Illustrator 5.5. Using gradient fills, which create blends between colors, would have been easier, but Pelavin had better control of color gradations with the blend tool, which blends objects and colors. For each blend, Pelavin drew starting and ending lines, giving each a colored stroke. With the blend tool, he selected each line and then chose the optimum number of intermediary steps suggested by Illustrator. The result is smooth color gradations that follow the shapes' forms. Pelavin filled some areas with radial gradients, which allowed him to shift the gradients' centers so that they provided a more modeled effect. The finished illustration *Lost Angeles* rivals a traditional airbrushed work, with its glowing, rounded forms.

Janet Ashford is the coauthor, with Linnea Dayton, of Adobe Illustrator: A Visual Guide for the Mac, *distributed by Addison-Wesley.*





1. Constructing the background. The bottom layer of *Lost Angeles* consists of overlapping shapes that depict a stylized sky and clouds. Making each shape means blending two lines stroked with color, here shades of yellow and gold. Viewing each shape in Artwork mode shows how it is constructed (**a**). An exploded preview over a dark background reveals the 12 blends that make up the sky background (**b**). Notice how the color gradations follow the wavy contours.



2. Using blends, not gradients. If Pelavin had filled each shape with a linear gradient (**a**), the results would not have been as subtle as with color blending between two stroked lines (**b**). For example, compare the appearance of one of the large shapes that make up the sky when it contains a gradient (**c**) with the way it looks with a blend (**d**). Artwork mode shows the blend's construction (**e**).



3. Modeling the car. To create a sleek, stylized 1930s-era automobile, Pelavin used the pen tool to draw several simple rounded shapes and then overlapped them (**a**). To add a three-dimensional effect to the car, Pelavin filled main shapes such as the back fender with radial gradients from light gold to dark gold. Illustrator automatically centered the gradients in the shapes (**b**). Pelavin then chose the gradient-fill tool, clicked on the left side of the fender to define a new center point, and dragged to the right to repaint the gradient in that direction (**c**). The wheels were modeled with blends.

EXPERT TIPS / BY BOB SCHAFFEL AND CHUCK WEGER

Send In the Substitute!

Desktop Color Separation and other image-replacement strategies cut down computer overhead and network traffic by giving you small files for proofing images.

PAGE-LAYOUT FILES from programs such as PageMaker and QuarkXPress are fairly small in terms of megabytes, but the continuous-tone images ("pictures" for those of us not in the service-bureau biz) can be huge — overwhelmingly so. When turned into a high-resolution, four-color file, a 4-x-5-inch image swells to 7 MB. If you're working on a 32-page catalog with four 4-x-5 color pictures on each page, that's 28 MB per page times 32 pages — almost 900 MB of data that must be passed from computer to computer.

These days, a plethora of solutions is available to let you avoid having to pass that much image data around on your network. We group them under the loose category *image substitution*. This month, we're going to discuss one of them: Desktop Color Separation (DCS). In future columns, we'll talk about OPI (Open Prepress Interface, developed by Aldus) and APR (Automatic Picture Replacement, developed by Scitex).

With DCS, a high-resolution image yields five EPS files. Four separation files contain the high-resolution data for each of the cyan, magenta, yellow, and black components. The fifth file — the master file — contains a screen preview, proofing data, and (most important) links to the high-resolution files.

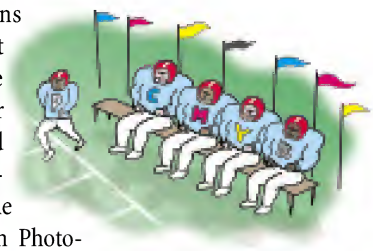
Because DCS separation files are just EPS files, they can contain clipping paths (allowing the definition of silhouettes within the file).

The proofing data in the master file is for low-resolution output, so the master file is typically much smaller than the high-resolution original image (an 8-x-10-inch image in Photoshop might be 27.5 MB, but its DCS master file is only about 2 MB). The master file can then be used in page layouts in the design, proof, and approval stages — meanwhile, the four high-resolution files are safely tucked away on a server somewhere, sparing the network a lot of traffic. When it's time for the final separations, the links point the system to the four high-resolution files. For proofing, only the master file need be available on your machine, but for final separations, all five files must be present in the same folder or else the Macintosh will provide a rather nondescript error message — a beep — to let you know there's a problem. Renaming the high-resolution separation files (which appear as filename.c., filename.m, and so on) also destroys the links.

Because they're in EPS format, DCS files contain special information that permits the high-resolution data linking. The PostScript code shown in "The DCS Link" was produced by Photoshop for a sample DCS master file. Lines that begin with % are called comments. Applications such as QuarkXPress and PageMaker use comments to handle image substitution correctly, but the output device ignores the comments.

The lines of code that provide links to individual files are highlighted in blue. They notify the page-layout application that the file has process colors and indicate which files contain the high-resolution data.

If something happens to the master file, you can recover it by some trickery — open any one of the DCS high-resolution files in a word processor, copy only its opening comments to a new file, manually add the DCS linking code shown below to the comments (making sure you get the capitalization, punctuation, spacing, and naming correct), and then save it as a new master file by giving it the proper filename. The proofing data and the preview will not exist, but the appropriate links will. You can then either print the separations or, if you want to restore the master file for proofing and viewing, simply reopen the master file in Photoshop and then resave it as an intact DCS file.



The point is, there's no need to trundle your high-resolution images around along with your page layouts. Using DCS can give your Mac and network a rest.

Bob Schaffel is technology director of the Professional Prepress Alliance. Chuck Weger is an independent consultant and publisher of the Photoshop Monitor *newsletter.*

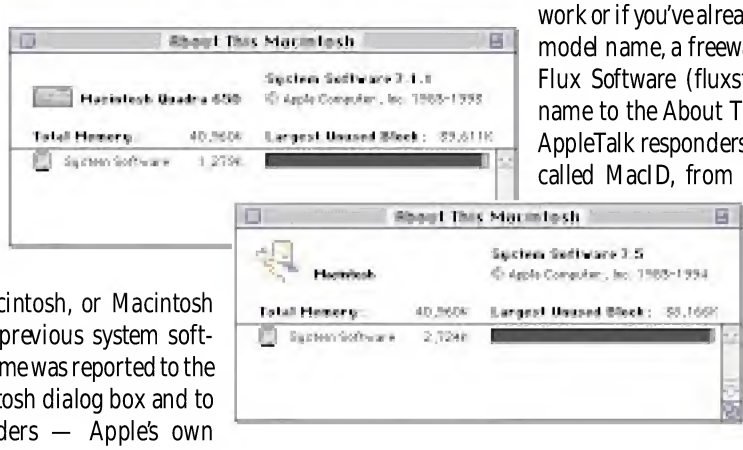
THE DCS LINK

```
%!PS-Adobe-3.0 EPSF-3.0
%%Creator: Photoshop Version 2.5.1
%%Title: MacUser DTP Tips
. . .
%%DocumentProcessColors: Cyan Magenta
  Yellow Black
%%CyanPlate: MacUser DTP Tips.C
%%MagentaPlate: MacUser DTP Tips.M
%%YellowPlate: MacUser DTP Tips.Y
%%BlackPlate: MacUser DTP Tips.K
%%EndComments
%%BeginProlog
. . .
```

NETWORK MANAGEMENT /

System 7.5 Loses Macs' Identities

APPLE GIVETH AND APPLE TAKETH AWAY, at least as far as System 7.5 goes. For all its new features, Apple's latest system software removes (under certain installation conditions) a feature network managers have come to rely on: the ability to report a Mac's model name. Instead, System 7.5 refers to the machine generically as either a Macintosh, Power Macintosh, or Macintosh PowerBook. With previous system software, the model name was reported to the About This Macintosh dialog box and to AppleTalk responders — Apple's own and those used in network utilities such as Techworks' (and now Saber Software's) GraceLAN products, Sonic Systems' Radar, and Neon Software's Traffic Watch. These applications use the Mac-model information to draw maps, update software, and perform inventories.



Apple decided not to have System 7.5 report model names because now that the company is using the same motherboard for models in different product families, the model-name information in some Macs' ROMs is no longer reliable. In Apple's view, no information is better than possibly erroneous information.

Fortunately, there are ways to prevent or correct model-name loss when you upgrade the system software on a Mac that didn't come with System 7.5 preinstalled. Such Macs will usually still report the model number if you install System 7.5 over your existing system software instead of installing it on a hard disk that doesn't have a previous version of the system. If this type of install doesn't work or if you've already installed 7.5 the other way and lost the model name, a freeware extension called MacIdentifier, from Flux Software (fluxsftwre@aol.com), can report the model name to the About This Macintosh dialog box — but not to AppleTalk responders. To get full reporting ability, try a utility called MacID, from Neon Software (800-334-6366 or 510-283-9771); it comes with Neon's LAN-surveyor package.

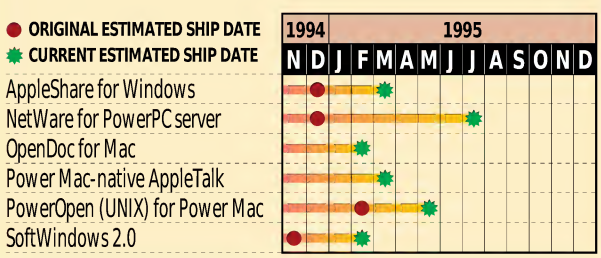
MacIdentifier and MacID are also available from on-line services; see page 4 for instructions on accessing MacUser's on-line areas.

Apple told us it was investigating ways to resume providing model names. If you want to encourage the company in this direction, send e-mail to boxflag@seeding.apple.com. / Mark Bieler

NETWATCH /

A Banner Year for New Technology

SINCE WE FIRST REPORTED on these products, some of the ship dates have slipped. Novell has decided to base its Power Mac NetWare server on the delayed version 4.11 of NetWare. OpenDoc will be supported first in the Mac OS and then in Windows and OS/2 later in the year. SoftWindows 2.0 is the version that will support 386 Enhanced mode operation. Some of these ship dates were given by the vendors; others are MacUser's projections.



MODEMS /

The Future Is Here (Almost)

V.34 MODEMS are proliferating, but there's still cause for caution among Mac users hankering to transfer data at rates as high as 28.8 kbps.

Although there's been a flood of V.34 modems available for Macs since U.S. Robotics' Sportster hit the market — with AT&T, E-Tech, Hayes, Logicode, Motorola, MultiTech, Practical Peripherals, and Zoom all joining the fray — keep in mind that the first-wave products may require revisions. Rockwell International, which supplies the chip set that controls modems from Hayes and Zoom, among others, experienced some firmware problems with early versions of its V.34 chip, causing some modems to fail to work properly. At press time, Rockwell announced that new versions of its chips would be backward-compatible to V.FC; look for vendors of Rockwell-based modems to offer upgrades to V.34 from their current V.FC products.

Global Village, the maker of popular PowerBook modems and Mac-friendly desktop models, was still leery of the new V.34 standard at press time, although it planned to introduce a V.34 model sometime in the first quarter of 1995. The company said it was being cautious out of concern about potential interoperability problems with so many new, untested products.

One more word of caution for Mac users purchasing V.34 modems for ARA connections: The CCL (connection control language) files ARA uses to issue modem commands need to be supplied by modem vendors at present, since Apple has yet to supply them. If you buy a V.34 modem, make sure it comes with the CCLs you need. / Shelly Brisbin



ETHERNET HUBS /

High-Speed Options



FOR THOSE WHO NEED BANDWIDTH at any cost, Grand Junction Networks (800-747-3278 or 510-252-0726) is offering one of the first 100BASE-T Ethernet hubs — that's 100 Mbps. For those with more traditional Ethernet LANs (and budgets), Tribe Computer Works (510-814-3900) and Lantronix (800-422-7055 or 714-453-3990) are offering new switched Ethernet hubs that bring 10-Mbps bandwidth to each Mac on a LAN.

Grand Junction's FastHub 100 ($3,995) is a 16-port nonswitching repeater compatible with the new 100BASE-T standard. Although Macs can't take advantage of the increased bandwidth directly until vendors ship a 100BASE-T adapter card for the Mac — possibly in the first quarter of 1995 — you can connect to a 100BASE-T Ethernet backbone with a Grand Junction FastSwitch 10/100 hub ($79.95 for 25 10BASE-T ports and 2 100BASE-T ports).

Not ready for 100BASE-T? Improve Ethernet speed with a switched hub such as Tribe's five-port TribeSwitch EN ($1,995; SNMP version, $2,495) or Lantronix's four-port LSB4 Ethernet Switch ($1,995). The TribeSwitch EN learns LAN configurations and uses on-the-fly switching, checking only the packet header to minimize packet-switching delay; the LSB4 reads all packets in their entirety to filter out the incorrect ones. You can manage the LSB4 via Telnet and DECnet log-ins, SNMP, and Novell PC or Mac software. / Nancy Peterson

COMMUNICATIONS /

Easier Connections

FOUR COMPETING COMPANIES recently released communications programs with similar improvements: easier access to TCP/IP networks and mainframes and support for new Mac OS features such as QuickDraw GX, AppleScript, Drag and Drop, and PowerTalk.

Wollongong's PathWay Access 3.0 ($350) has expanded its traditional TCP/IP functions to include mainframe-terminal emulation over TCP/IP and PPP connections. Version 3.0 also includes access to Usenet newsgroups; built-in e-mail using the SNMP, POP, and IMAP standards; and a new graphical interface for FTP that includes drag-and-drop file transfer. 800-962-8649 or 415-962-7100.



Attachmate's EXTRA! for Macintosh 2.0 ($295 through March) is a TN3270 emulator that features full support of AppleScript; it's scriptable, recordable, and attachable. Included AppleScript "droplets" provide such features as drag-and-drop file transfer for users and examples that help administrators use AppleScript to automate user setup over a network. Version 2.0 lets Mac users connect to mainframes over NetWare for SAA as well as over TCP/IP, and it provides FTP file transfer to IBM hosts. In addition, a new 3287-host-printer emulation lets you preview, format, and print terminal documents to AppleTalk printers. 800-426-6283 or 206-644-4010.

5PM TermOffice 3.0 ($375), from About Software, also adds new scripting capabilities. Using an expanded version of HyperTalk, users can put scripts and macros onto menus and link them to hot spots on the screen. Users can also generate scripts automatically and exchange them with the new Windows version of 5PM TermOffice. Both versions provide a wide range of terminal emulations, including those for IBM mainframes; AS/400 midrange computers; and VAX, UNIX, Unisys, and Honeywell/Bull hosts. 800-557-6389 or 408-725-4242.

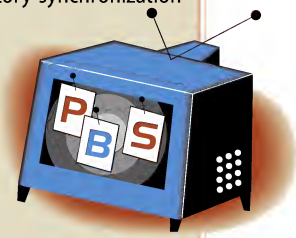
Pacer Software's PacerTerm 3.0 ($249) also uses HyperTalk scripting. It supports a variety of communication tools, including FTP, Telnet, PPP, SLIP, LAT, Xmodem, and Zmodem. New in version 3.0 are support for the PC-ANSI graphics standard (so you can log on to BBS systems running on PCs) and for VT420 terminals. In addition to having a spruced-up interface, PacerTerm 3.0 supports PowerTalk and System 7.5's Drag Manager. 508-898-3300. / John Rizzo

ILLUSTRATION / JAMES O'BRIEN

NET BYTES

Some Notes on Lotus

AFTER SOME PRODDING by Apple, **Lotus** has changed its mind about the Power Mac; it *will* deliver a Power Mac-native **Notes** client this summer. Lotus had previously announced that the company would not support the Power Mac. ➥ **PBS** is creating a nationwide viewer-communications system, using one million licenses of **SoftArc's FirstClass.** The deal with PBS gives the groupware package a larger installed base than that of Lotus Notes. PBS Online, to be offered by local PBS stations, will provide educational information and conferences. The United Nations is also using FirstClass for a public-access system, called TogetherNet. ➥ **Control Data Systems** (800-257-6736 or 612-482-6736) is now offering a Notes gateway module ($6,500) and a directory-synchronization module ($3,250) for **Mail*Hub,** its UNIX-based mail-gateway system for enterprise networks. With the directory module, Mac users can access the Notes directory from within QuickMail, Microsoft Mail, and other mail systems. ➥ To aid roving net managers, version 3.2 of **NetMinder Ethernet** ($695), the network analyzer from **Neon Software** (800-334-6366 or 510-283-9771), features support for 500-series PowerBooks and for Newer Technologies' Ethernet docks for Duos. ➥ **Saber Software** has acquired **GraceLAN Network Manager, GraceLAN SNMP,** and **GraceLAN Update Manager** from TechWorks for $850,000 in cash. Saber plans to merge the Mac software with its SaberLAN line of management/workgroup software for PCs. ➥ Mac users accessing UNIX machines via the X Window interface have two new products for Macs and Power Macs. **MachTen X Software Release 3.0 for Mac** ($350), from Tenon Intersystems (805-963-6983), runs on top of Tenon's MachTen UNIX environment for Macs. Tenon says the X Software provides speed similar to that of Sun SPARC machines, even on 68040 Mac hardware. **AGE** (619-455-8600) has acquired MacX from Apple, added security features, and claims to have doubled the product's speed. Now called **XoftWare for Macintosh,** the software is expected to ship in the first quarter of 1995. / JR



NETWORK HELP / BY KURT VANDERSLUIS

Network Help

The industry's leading LAN-troubleshooting sleuth diagnoses nonfunctioning zones and helps you decide when to use SNMP and segment a network.

Who Needs SNMP?

Q. I have a small network of about 80 workstations, mostly Macs. Is SNMP important or useful for me?

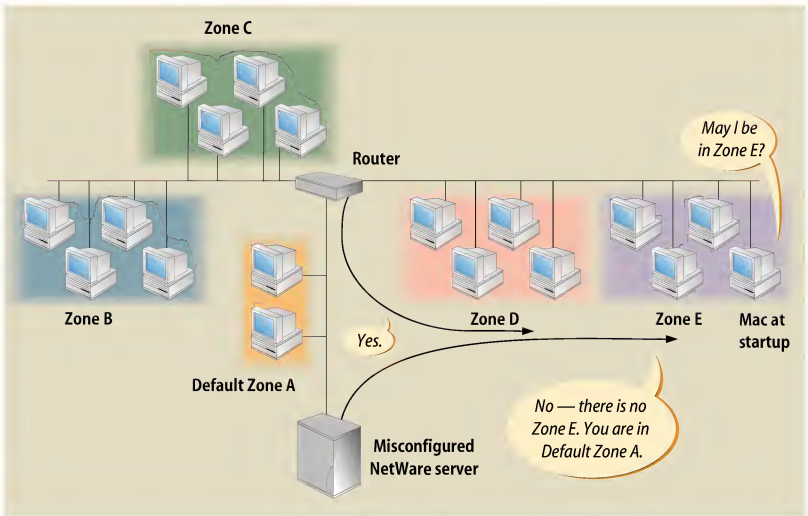
Seth Bender
Boulder, CO

A. Because your network is mostly Macs, SNMP (Simple Network Management Protocol) cannot provide system and network management that is as easy or as in-depth as what AppleTalk-only products provide. However, should you decide to expand your network to a mix of platforms, vendors, and network protocols, SNMP would provide a standard way to manage and retrieve information from those devices at a single point.

An SNMP system has three components: the *console,* a workstation on which the network-management software retrieves and manages information from other network devices; the *agent,* usually a background process running on each of the devices that must be managed; and the *MIB* (Management Information Base), a set of data definitions describing the information that the console can access and manage. For Macs, the SNMP agent and MIB components are now included in each of two software packages from Apple — AppleTalk Administration for Macintosh 1.1 and TCP/IP Administration for Macintosh 2.0.4 ($199 each). Although most full-function consoles are UNIX-based, a few network-management applications support some SNMP-console functions on Macs. These include two products from Neon Software (510-283-9771) — LANsurveyor ($395 for 5 zones, $695 for unlimited zones) and RouterCheck ($649) — as well as WatchTower ($2,495), from Intercon (703-709-5500), and NetWORKS ($2,495 for 100 nodes), from Caravelle (613-596-2802).

figure 1

Getting a Zone / when NetWare makes trouble



When a Mac starts up, it asks the network if it is in the correct zone. Since a NetWare server's router responds faster than most other routers, a misconfigured NetWare server will give the Mac wrong information before the other routers can give it the correct answer.

Twilight Zones

Q. Our Ethernet network has five zones defined. Lately, we've been able to use only the default zone. What's going on?

Barbara Cox
Cambridge, MA

A. This sounds like a classic mistake in NetWare-server installation. It happens when the Novell technician setting up the NetWare server's router misunderstands the concept of AppleTalk zones and defines only the default zone and not the zones for an existing network.

When you start up your Mac or when you switch from one zone to another, your Mac tries to confirm the validity of your desired zone. The Mac broadcasts a ZIP (Zone Information Protocol) GetNetInfo packet that says, "May I be in the <desired> zone?" All the routers on the network respond to this broadcast, but the Mac listens only to the first response it gets (see figure 1).

Because the NetWare server's router typically responds a little faster than the other routers on the network, it is usually the one the Mac listens to. A misconfigured NetWare server informs the Macintosh that the

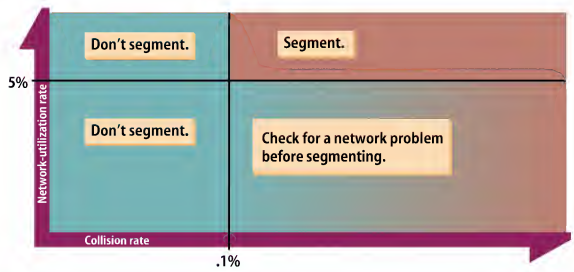
Write to Network Help

c/o *MacUser*
950 Tower Lane
18th Floor
Foster City, CA 94404
You can also send your question to Kurt VanderSluis on AppleLink at KVANDERSLUIS.

ILLUSTRATION / VICKI SWART

figure 2

Network Utilization and Collisions / when to segment



As long as the collision rate is low, you don't have to segment your network even if network utilization is high. However, a high collision rate and a low network-utilization rate can indicate a collision-generating problem instead of the need to segment.

desired zone is not valid and tells it to use the default zone instead. Users then see a dialog box telling them they have been placed in the default zone. When they try to use the Network control panel, they're unable to select any zone but the default zone.

Although this problem can occur with any router, the existence of nonfunctioning zones is epidemic with NetWare servers. A NetWare server doesn't check to see if other routers have already defined zones; it checks only to see that the NetWare-defined zones are valid. In addition, Novell technicians tend to be relatively new to AppleTalk. It's not all their fault, though, since the NetWare configuration files don't make clear how multiple zones are defined.

You can use Neon Software's RouterCheck to find out if any of your routers (including the NetWare server's) have been misconfigured. To check a NetWare server's router, you can also go through the NetWare setup files and look for zones. The first file to look in is AUTOEXEC.NCF, where most Novell technicians seem to prefer to put the AppleTalk network and zone definitions. However, this file cannot accept network and zone definitions (called Bind Statements in NetWare-speak) longer than 82 characters; if they are longer, they must be defined in the ATZONES.CFG file.

Segmented Networks

Q. What kind of utilization rates should I see on Ethernet before I consider segmenting my network or getting switching hubs?

David Morton
Seattle, WA

A. I've heard many answers to this question and have done some research on this issue. Here's my answer: The level of Ethernet utilization, taken by itself, is not that important. The more important statistic to watch is the average collision rate (the percentage of collisions relative to the number of total packets, averaged over a five-minute period). As long as your average collision rate stays at less than .1 percent, your Ethernet network is running fine and you don't need to segment it.

However, a high collision rate might not indicate the need to segment the network but instead could indicate that a problem is causing excessive collisions (see figure 2). For example, if your utilization is below 5 percent and your collision rate is above .1 percent, it's possible that your system has some bad or low-grade wiring, which can produce collisions. When a node sends a signal to a hub over poor wiring, the transmit pair causes cross talk on the receive pair, which your transceiver interprets as a collision.

Another possible source of a high collision rate is a node that is broadcasting some sort of lookup question to which all the other nodes are simultaneously responding. You'll have to use a protocol analyzer to spot this. Processes that broadcast these kinds of questions include QuickMail's QuickConference feature and Apple's AutoRemounter (version 1.0). Another culprit is the Chooser, which broadcasts lookups for servers within one zone. If you have a lot of servers within one zone, the Chooser will be flooded with simultaneous responses, which is why you want to keep the number of servers in each zone low. An open System 6 Chooser continues to broadcast; the System 7 Chooser, on the other hand, doesn't bog down the network, since it searches the network for only a couple of minutes and then goes to sleep.

BREAKING THE RULES / *multiple bridges*

Q. We have a large bridged network, and we are currently at the Ethernet limit of seven bridges between two Ethernet nodes. Some are remote bridges between Regina and other cities throughout Saskatchewan. Is there a danger if we exceed seven bridges?

Rick Black
Regina, SK, Canada

A. The seven-bridges rule can sometimes be broken, depending on your network configuration. Each bridge introduces a *latency* as it forwards a packet from one Ethernet segment to another. If the travel time between two nodes becomes too long, it can interfere with an AppleTalk-network process. For instance, a delay of over 2 seconds can result in duplicate AppleTalk addresses, because Macs obtain their AppleTalk address by choosing a temporary address and searching the network to see if another node already has this address. If the Mac doesn't get a response within 2 seconds, it will adopt the temporary address.

When there is little traffic, an Ethernet bridge's latency may be only a millisecond or so, but under heavy traffic loads, the latency may be much longer, possibly several tenths of a second. To see how much delay is added by your bridges, run the Inter•Poll echo test (see Network Help, November '94, page 147) from the center of your bridged WAN in Regina. You should run the test during normal business hours. Suppose, for instance, that the round-trip time ranged from .01 second for nodes on the Regina network to as much as .78 second for Ethernet nodes at the farthest reaches of your bridged WAN. Since the data is being taken from the center of your WAN, the round-trip time between distant sites on opposite ends of the WAN would be about two times .78 second, or about 1.5 seconds.

Because traversing the entire WAN under normal conditions can take 1.5 seconds, it's not too hard to imagine that there would be times when a Mac could not finish searching the entire network for a node number within its allotted 2 seconds. If further investigation with a Network General Intelligent Sniffer reveals a few duplicate AppleTalk addresses located at the fringes of your WAN, I'd have to say that you've already reached your bridge limit.



MAC TO PC / BY JOHN RIZZO

Report from the OS Wars

As the makers of Windows 95 and OS/2 Warp blast each other, Apple is countering with 486 cards for Macs and other strategic cross-platform tactics.

THE LANGUAGE WAS HOSTILE, with incumbents and challengers hurling sleazy innuendos and half-truths at each other. No, I'm not referring to the November elections but to the latest battle in the operating-system wars. IBM launched the first volley when it released its OS/2 Warp operating system. Along with the release came some harsh words about its soon-to-be competitor, Windows 95. IBM said that Windows 95 was merely old Windows 3.1 code wrapped in a new package. It claimed that Windows 95's biggest new feature, multitasking, was only "semipreemptive," meaning that Windows applications were as likely to crash as ever. IBM also predicted that OS/2 Warp would soon outsell Macintosh.

The Microsoft counterattack on OS/2 Warp was as tough as anything California senate candidate Mike Huffington ever dished out. "It's a cheap imitation" of the still unreleased Windows 95, said Microsoft vice president Brad Silverberg, according to *The Wall Street Journal*. "They've basically taken what we've announced and said 'me too.'" (An interesting comment, considering all the ideas Microsoft has pilfered from the Mac over the years — File menus, cut-and-paste, plug-and-play.)

For its part, Apple shot off the marketing equivalent of a popgun, releasing a new smiley-face logo to represent compatibility with Mac OS, the new name for the Mac's system software. The reason for Apple's relative silence is that its big gun in the OS Wars, the preemptive-multitasking operating system code-named Gershwin, won't appear until 1996. Until then, Apple's battle plan is to beat the PC operating systems by joining them — using strategies designed to help the Macintosh fit more smoothly into corporate cross-platform environments.

Apple's arsenal contains three main strategies. The first is the licensing of Mac OS and the Mac ROM to other hardware vendors and the eventual development of a PowerPC machine that will run both OS/2 and Mac OS. The second is offering more ways to get Windows running on Macs. The third is developing software for better cross-platform networking.

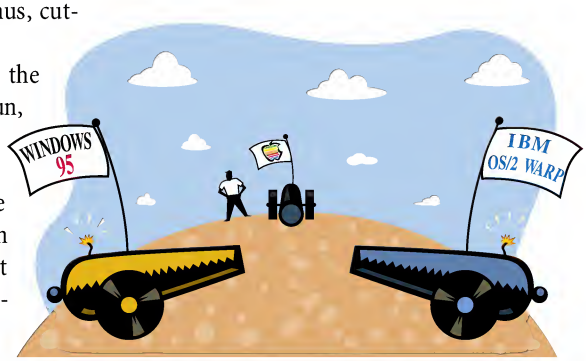
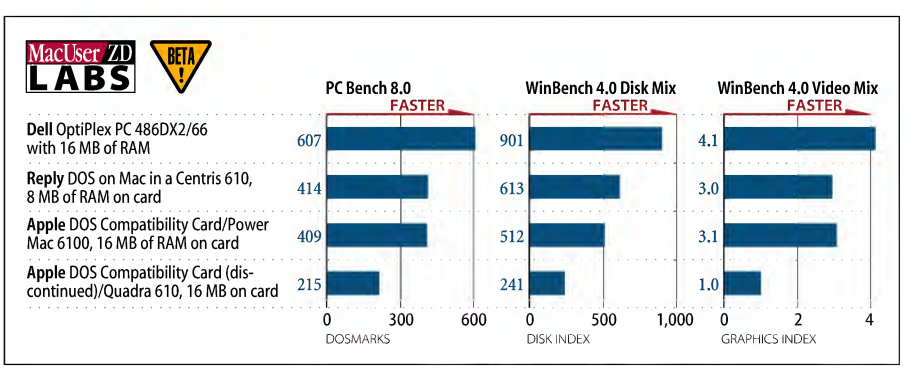


ILLUSTRATION / LIN WILSON

FASTER WINDOWS ON MACS / *second-generation models outrun Apple's first DOS card*

WE TESTED PRERELEASE VERSIONS of Apple's new DOS Compatibility Card and the first clone card from Reply, the DOS on Mac card. The new Apple card in a Power Mac 6100 and the Reply card in a Centris 610 were significantly faster than Apple's discontinued DOS Compatibility Card in a Quadra 610, although still not as fast as a high-end 486 PC such as the 486DX2/66 Dell OptiPlex we tested. Like the OptiPlex, the new cards contain a 66-MHz 486DX2 chip, whereas the original Apple card has a much slower processor — a 25-MHz 486SX. PC Bench 8.0 measures speed for DOS tasks, and the WinBench tests measure speed for disk-intensive and graphics-intensive Windows tasks. All of the PC applications we ran with the cards (including the all-important Solitaire) ran smoothly and without problems.



If You Can't Beat 'Em

For the many Macintosh users who were disappointed when Apple suddenly announced that there just weren't any more DOS Compatibility Cards, there is good news and better news. The good news is that Apple is back in the 486-card business, with an improved DOS Compatibility Card, this time for running DOS and Windows on the Power Mac 6100 instead of on the Quadra 610. The better news is that Apple has licensed the basic design to people who know how to build 486 systems — and who will build DOS cards for more Macintosh models.

Apple's Souped-up 486 Card. The new DOS Compatibility Card, which fits in the 6100's PDS (processor-direct slot), features several improvements over the original DOS Compatibility Card. First, it uses a 66-MHz 486DX2 chip rather than a 25-MHz 486SX. Our tests show that this chip difference makes the new card about two to three times faster than the discontinued card (see the "Faster Windows on Macs" sidebar). In addition, the new card includes a 16-bit Sound Blaster-compatible module (playback only), so you can run all the popular politically incorrect Windows games. The new card's SIMM slot can also hold twice as much RAM as the old card's — as much as 32 MB — or it can share the Power Mac's RAM, if you don't mind slower speed. Another new feature is the addition of ODI (Open Datalink Interface) drivers for NetWare and TCP/IP, so you can run DOS and Windows networking software.

These improvements aren't free; the new $699 price tag is $300 higher than that of the first DOS Compatibility Card. Also, the price doesn't include the cost of Windows, because Apple doesn't want to be in the business of selling a competing operating system.

Reply's Cornucopia of Clones. Apple's new card has many virtues, but you can get more DOS for your dollar from Reply (408-942-4804), the first announced licensee of the card. Reply offers a clone of the DOS Compatibility Card, called DOS on Mac, for approximately the same price as Apple's card. Reply charges $50 extra for the network ODI drivers that are included in Apple's product, but the company more than makes up for this charge by throwing in Windows 3.1 as well as Doom, the ever popular 3-D blood-and-guts game, for free. Stripped of Windows, Doom, and the Sound Blaster module, the product drops to $595 in price — or $495 if you opt for a slightly slower 50-MHz 486DX2 chip.

The DOS on Mac card is also available for more Mac models than the Apple DOS Compatibility Card. Reply offers cards for the Quadra/Centris 610 and the following other Quadra models: 650, 660AV, 700, 800, 900, and 950.

Notably absent from the preceding list are the Power Mac 7100 and 8100. Although it has not announced any products for them, Reply does have the experience needed to develop DOS on Mac cards for these Power Macs. Known for building logic-board upgrades and accelerators for IBM PS/2 PCs, Reply also has some experience with the PowerPC architecture, since the company builds a PowerPC-based PC for Motorola.

What About Orange Micro? Both the DOS Compatibility Card and the DOS on Mac card are cheaper than the OrangePC cards offered by Orange Micro, which are higher-end products. Orange Micro's cards are designed for a NuBus slot, which allows slower data transfer than a PDS but is more versatile, because it lets you move the card among several Mac models. Orange Micro also offers faster processors than Apple or Reply, as well as PC expansion slots. Still, there is nothing preventing Orange Micro from licensing the DOS Compatibility Card technology to fill out the low end of its product line, although the company admitted no such plans at press time.

Join Together Better

For users more interested in Mac-and-PC *networks* than in Mac-and-PC Macs, Apple is working on two key projects: new AppleTalk client software for Windows machines, and Open Transport, Mac software that will make it easier to put Macs on PC networks.

AppleTalk Does Windows. The first AppleTalk Windows product, AppleShare for Windows, is expected to appear sometime in the first quarter of 1995 (its ship date having slipped from the fourth quarter of 1994). Following on its heels will be Windows client software for AppleSearch and for Apple Remote Access. What all three products have in common is a faster, more efficient AppleTalk

protocol stack that will offer a more attractive PC networking option. Still, AppleTalk is not likely to be widely accepted on PCs, particularly at sites where Macs are in the minority. Customers at these sites are more likely to be interested in Open Transport, since its goal is to fit Macs more easily into the non-AppleTalk networks prevalent in many corporations.

Open Transport to the Enterprise. Open Transport is a major reengineering of Mac OS's networking software, with cross-platform compatibility as the goal. In user interface, management, and programming, Open Transport will be multiprotocol in nature, as opposed to today's AppleTalk-centric system.

When it is released (probably in the middle of this year), Open Transport will support AppleTalk, TCP/IP, and serial connections, with Point-to-Point Protocol (PPP) and IPX coming later as plug-in modules. In addition to supporting multiple protocols, Open Transport will let a Mac run multiple protocols simultaneously with multiple Ethernet cards.

Customers at sites where Macs are in the minority are more likely to be interested in Open Transport than in AppleTalk.

Open Transport will allow developers to use a single API to write Mac networking software for various protocols, instead of having to use a separate API for each protocol. This added capability comes at the expense of the Communications Toolbox, which Apple is planning to abandon. However, users will be able to run their old software with the first release of Open Transport. And developers who create network software for PCs and UNIX machines will find that Open Transport uses industry-wide network programming standards that they're familiar with.

Finally, Open Transport will offer a bonus in the Power Mac area: Its native Power Mac drivers will give networked Power Macs a significant speed improvement over the speed of today's emulated network system software.

When the Smoke Clears

Will any of these strategies help Mac OS survive the OS Wars? Apple has set its goals pretty high: It hopes to gain an additional 25 to 30 percent in the operating-system market over the next few years. But with Gershwin delayed until 1996, it seems to me that Apple should set its short-term sights on cooperation, not domination, and deliver cross-platform technologies such as Open Transport as soon as possible. After all, it's not clear that *any* of the new operating systems — Gershwin, OS/2 Warp, or Windows 95 — will succeed against the mightiest competitor of all in the OS Wars: Windows 3.1.

MacUser *technical editor John Rizzo is the author of* MacUser Guide to Connectivity *and* How Macs Work.

Six Super Fixes

YOU'VE TRIED ZAPPING the parameter RAM, rebuilding the desktop, disabling your extensions, and doing a clean reinstall of the system software, but your Mac still won't do what it's supposed to. Is the repair shop your next stop? Not necessarily. Those common repair techniques may be too basic for some problems you're encountering with your Mac. Here are six methods that, although they're still simple, go beyond the well-known fixes. **/ BY TED LANDAU**

1 Detonate the Desktop

Rebuilding the desktop is the aspirin of the Mac world, known to cure such ills as missing custom icons, applications that won't launch, and even a Mac that won't start up. But if the standard rebuild remedy (holding down Command-Option during startup) doesn't fix your Mac, going one step further may do the job.

The standard rebuild only updates the Desktop files (one or two invisible databases); for instance, it clears out information about deleted documents. If the Desktop files are damaged, you may need to delete them entirely and start with new ones. The easiest way to delete them is to use a utility, such as MicroMat's freeware TechTool (available on-line; see end of article). When you use this type of utility, your Mac will create new Desktop files the next time you start up.

2 Zap *All* the Parameter RAM

If your Mac won't recognize connected SCSI and serial devices, such as modems, printers, and external drives, or if some of your control-panel settings are suddenly wrong, the cure may be zapping the parameter RAM (PRAM). This clears the data in the PRAM and enters default data. The documented method (holding down Command-Option-P-R at startup) may not cure all PRAM problems, because it clears only *some* of the data stored in the PRAM. To zap *all* the PRAM data, you need a utility such as TechTool.

TechTool can also help you prevent the loss of your control panels' customized settings. To do this, you must use TechTool to save PRAM data when your Mac is healthy. When the big crash comes, you simply zap the PRAM and then instruct

PHOTOGRAPHY / LEON

Control-panel settings are wrong
(*try technique* **2**)

A document won't print
(*try techniques* **2** *and* **5**)

Applications won't launch
(*try techniques* **1**, **4**, *and* **5**)

The Mac won't recognize an external hard drive
(*try technique* **2**)



Custom icons turn drab
(*try technique* **1**)

The Mac won't delete a file
(*try technique* **6**)

The Mac won't start up
(*try techniques* **1**, **2**, *and* **3**)

TechTool to restore the data you saved before the trouble began. If you didn't save your settings and have to restore them manually, don't forget to turn on 32-bit addressing in the Memory control panel; otherwise, you won't be able to access more than 8 MB of RAM.

Bypass Your Internal Drive

If your Mac crashes at startup and turning off all your extensions at startup (by holding down the Shift key) doesn't prevent the crash, the next step is to try starting up from another disk. To bypass the internal drive, just hold down Command-Option-Shift-Delete at startup.

3

It's more convenient to start up from an external disk that contains a System Folder than it is if you do so from a special floppy. If you don't have a copy of your System Folder on an external disk, create one now, before your next crash.

Purge Bad Preferences Files

Damaged preferences files are a notorious source of application-specific problems, such as an application that won't launch or one in which the Open and Save commands don't work. The standard fix for these types of problems is to replace the application, using the original disks. However, this method doesn't work if the problem is due to a damaged preferences file, because replacing the application doesn't replace the preferences file. Instead, you need to delete the file. Your application will probably create a new preferences file the next time you launch it. If it doesn't, you'll have to copy the preferences file from the original or backup disks.

4

Deleting a preferences file is as simple as dragging the file to the Trash, but the file isn't always easy to locate: Usually the preferences file is in the Preferences folder in the System Folder; however, sometimes it's not there or has a coded name. If you're unable to find the file, try two utilities — GetMoreInfo and FindPro (available online) — to locate it. GetMoreInfo will help you learn the creator code of your problem application — for example, MSWD is the code for Microsoft Word. Once you know the code, you can use FindPro to search for files based on that code. The preferences file is sure to be among them. (If you have System 7.5, you don't need FindPro — the 7.5 Finder has the ability to search by creator code.)

Find Faulty Fonts

A damaged font file is another possible reason for application-specific problems, such as apps that won't launch or documents that won't print. You can find out if a font file is damaged by quitting all of your currently open applications and then dragging the Fonts folder out of your System Folder and into any other folder on your disk. If the problem application works after you've moved the Fonts folder, it's likely you have a damaged font file. (Some system software stores fonts in the System file. If moving the Fonts folder doesn't work, remove the fonts from the System file and put them elsewhere on your Macintosh.)

5

Figuring out which font is the culprit requires the time-consuming process of returning the fonts to their original location one by one and testing your application each time. You can save some time by moving half the fonts back to their original location as a single batch. If the application works after you've moved that batch of fonts, then you know that your problem font is in the group you didn't move. Move half of the remaining fonts back to their original location, and test the application again. Continue this process until you've isolated the faulty font. When you do find the culprit, delete it. If it's a font you treasure, replace it from the original disks.

Deep-Six Stubborn Files

If your Mac tells you it can't delete a file you've dragged to the Trash and you've already tried to fix it by making sure the file is unlocked (the Locked check box in the file's Get Info window is unchecked) and by making sure the file is not "in use" (it's closed), you can resort to a couple of other techniques that should get rid of that pesky file. If it's a font file, try the solution in technique 5 above — that is, drag the entire Fonts folder out of the System Folder and then drag the individual font file to the Trash. (Sometimes your Macintosh does not allow you to drag separate font files directly from the System Folder.)

6

A more general solution in the case of almost any file your Mac won't delete is to create a dummy file with the same name as the problem file. Drag the dummy file to the folder that contains the problem file, and click on OK when you get a message asking if you want to replace the problem file. Delete the dummy file, and you're done.

The End to Your Troubles

Although they're not tricky to try, these repair tricks, along with dirt-cheap shareware (see the "Low-Budget Repairs" sidebar), provide powerful protection against Macintosh crankiness and may even keep your Mac out of the repair shop.

Contributing editor Ted Landau offers much more troubleshooting advice in his book Sad Macs, Bombs and Other Disasters. *A second edition is due out in mid-1995.*



You can find the programs referenced in this article in the MacUser and ZiffNet/Mac areas on CompuServe and eWorld. See page 4 for instructions on accessing ZiffNet/Mac.

Low-Budget Repairs

REPAIRING YOUR MAC doesn't have to be expensive. Besides using the techniques suggested in this article, there's a wealth of inexpensive — and totally free — shareware to help you make your Mac run the way it should.

We've already mentioned TechTool, GetMoreInfo, and FindPro, but those are just the beginning. Other favorites include SCSI Probe, which lets you mount SCSI devices not mounted at startup, and Apple's MacCheck, which can diagnose a variety of software and hardware problems.

Also consider lesser-known utilities; for example, using Bomb Shelter sometimes enables you to recover from a system crash without having to restart. And if you're plagued by "out of memory" messages, check out Finder Fixer, which can eliminate those messages in System 7 by increasing the Finder's memory allocation as needed. System 7.0 users may also find Volume Name Unlocker a useful utility; it unlocks volume names that get inadvertently locked as the result of a System 7.0 bug. (The bug was fixed in version 7.1.)

These and other shareware programs offer some of the most practical and inexpensive ways to keep your Mac running smoothly. All these programs can be found on-line.



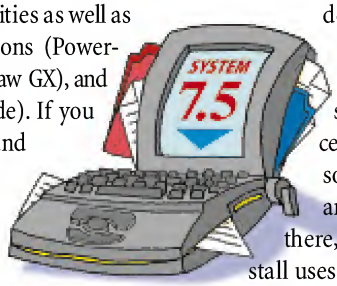
MOBILE MAC / BY SHARON ZARDETTO AKER

Savvy System Hopping

Old PowerBooks and new system software don't always mix. Here's some advice on making — or resisting — the switch.

BY THE TIME YOU READ THIS, it will be safe to make the 7.5 leap. System 7.5 will have been out for nearly six months, so tens of thousands of jump-on-the-bandwagon enthusiasts will have tested it for you. And updates should be available to fix any problems they found — such as the QuickDraw GX incompatibility with fax-modem software, reported at press time.

But although it's finally safe to advance to System 7.5, is it *necessary?* Practical? Truly advantageous? The answers to these questions lie mostly in the limits on your PowerBook's RAM and the size of its hard drive. If you have a PowerBook 150, a 500-series model, or a Duo and if you have lots of RAM, you can consider System 7.5 on its own merits — which include some handy PowerBook-specific utilities as well as improved communications (PowerTalk), printing (QuickDraw GX), and on-line help (Apple Guide). If you don't have lots of RAM and hard-disk space, you should consider how much of System 7.5 it's practical to install.



Immense Installs

A full install of System 7.5 — including PowerTalk and QuickDraw GX — gives you a System Folder that takes up more than 27 MB (about five times the size of the basic System Folder for 7.1!) and uses 4.5 MB of RAM. Since you're bound to have a few third-party extensions, let's call it 28 MB on-disk and 5.5 MB in RAM overall.

The original PowerBooks (and the minor-improvement models that followed) each have a limit of 8 MB of RAM. That means running System 7.5 requires the dedication of nearly 70 percent of RAM; a second-wave model that can go to 14 MB of RAM still sacrifices almost 40 percent of that total to the system software. As for disk space, there are still 40-MB PowerBooks out there, and a full system-software install uses 70 percent of that space. Even an 80-MB hard drive gives up a significant portion of its capacity to accommodate the system software.

And by the way, we haven't even mentioned sharing disk space and RAM with some heavyweight upgrades to two high-profile programs: Excel 5 and Word 6. Here's some interesting math about full installs and basic memory usage:

	SYSTEM 7.5	EXCEL	WORD	TOTAL
DISK	27 MB	22 MB	22 MB	71 MB
RAM	5.5 MB	3 MB	3 MB	11.5 MB

Of course, you may choose less than full installs of some software — but that's the point. For many PowerBook owners, using System 7.5 is going to feel like the early PowerBook days, when 20- and 40-MB drives meant trimming the System Folder size and when models with 2 or 4 MB of RAM forced us to conserve memory.

The Slimmed-Down System

OK, let's quit whining and get to work. You have at least a 40-MB hard drive and 8 MB of RAM (anything less just won't work for System 7.5), but you're not in the high-RAM bracket of Duo and 500-series PowerBook owners. How do you squeeze everything in?

First, you might as well forget both

POWERBOOK SECRETS / *avoiding that snap, crackle, and*

IF YOU CAN HEAR the little crackle of static electricity when you touch something, that's the effect of about 10,000 volts of electricity jumping from, say, a doorknob to your fingertip. So? So it can take as little as 10 (count 'em, *10)* volts to ruin some of the circuits inside a PowerBook.

Here's a two-pronged approach to protecting your PowerBook from static damage if you're going to work inside it: Prevent the static charge from building up, and provide a way for any buildup to discharge.

Environmental factors that encourage static buildup include low humidity; carpeted areas; and wearing fabrics such as nylon, polyester, or wool. Shuffling across a floor, touching another person, or running your fingers through your hair can build up a charge too. Yes, this does imply that the safest way to work on your PowerBook is standing still, naked, and alone in a tiled bathroom — with your head shaved. But it's probably more practical just to get off the carpet and avoid touching your hair.

Grounding provides a safe route for a static discharge if one builds up despite your precautions. A *grounded workstation pad* is a conductive mat that can be attached to a grounded outlet; a *grounding wrist strap* is a band of conductive material that goes from your wrist to a grounded pad or outlet. Together, these items should safely discharge any static, and both are available from electronics stores and catalogs. At the least, use a wrist strap; you can find them for less than $10 from some suppliers. Don't try to make your own, since a wrist strap is more than a just a chain or band; a grounding wrist strap includes a safety resistor that will keep a direct electrical short from electrocuting *you.* / Rich Wolfson

PowerTalk and QuickDraw GX. Since they need to be installed separately from the system software, you don't have to remove them — just don't put them in to start with, and you'll save about 3 MB of RAM and 15 MB of disk space. Although I think that PowerBook users are more likely to network and telecommunicate than most desktop-Mac users do and that it's a shame to have to forgo PowerTalk's promise of easily manageable communications, some sacrifices have to be made. As for QuickDraw GX, you'll have to do without its type-handling and printing niceties — such as the ability to queue up documents to various printers while you're on the road — until you have more RAM and disk space.

Removing PowerTalk and QuickDraw GX puts a 7.5 install in the same RAM ballpark as a 7.1 install: about 2.5 MB for a system with a few can't-live-without-them extensions. The hard-disk footprint is still more than twice the size of 7.1's 4-to-5-MB system-software install, but you can regain more than 5 MB just by cutting out a few more disk-hogging amenities: Apple Guide (2,185K), AppleScript (1,090K), QuickTime (1,690K), and CD-ROM support (415K).

Run the Installer to deinstall these items if you're going to dump them, because each item is actually more than one file.

Extra printer drivers, which take up 50K to 500K apiece, are also expendable. If you're using only one printer, you need only its driver — trash the rest from your Extensions folder; and if you don't use the LaserWriter 8 driver, get rid of the Printer Descriptions folder, which takes up 545K.

Finally, there are the old standbys: fonts. Trim them down, throw them out.

Alternative Routes

Should you decide not to install System 7.5, you can still get many of its handy amenities in shareware form or as separate products. Three freeware programs that provide features rolled into 7.5 are the WindowShade control panel, which lets you collapse any window down to its title bar; SuperClock, which puts a battery-level indicator onto the menu bar; and FindPro III, which improves the Finder's finding capabilities (all available on-line; see end of article). The improved PowerBook control panel in System 7.5 comes in the 3.0 update to System 7.1. And the flawed-but-useful Control Strip, included in 7.5 (as well as in versions of System 7.1 preinstalled on 500-series PowerBooks), is also available as part of the $99.95 PBTools battery-management utility, from VST (508-287-4600). By opting for some of the freeware mentioned here, you can avoid the 7.5 upgrade cost (which can range from $10 to $99) and spend your money on PBTools — or on a file-syncing utility that's more full-featured than System 7.5's File Assistant (for example, the $129 PowerMerge, from Leader Technologies; 714-757-1787).

Just Do It!

For those who decide to move to System 7.5 despite the obstacles early PowerBook models present, here are some tips to help ease the transition:

Get a larger hard drive if yours is smaller than 80 MB. You can get an internal PowerBook drive from a company such as APS Technologies (800-235-2753 or 816-483-6100), which can also sell you a case and a power supply for the old one so you can use it as an external drive for any Mac.

Upgrade your RAM if your PowerBook can handle more than it already has.

Strip your System Folder of items you don't need, to save disk space and RAM.

Use a RAM-increasing utility such as RAM Doubler or Maxima, both from Connectix (800-950-5880 or 415-571-5100), to fool your PowerBook into thinking it has more RAM than it really does.

Use a compression utility such as Norton DiskDoubler Pro, from Symantec (800-441-7234 or 503-334-6054), so you can store more on your hard disk.

And be sure to follow the directions! Especially the ones in the ReadMe file for System 7.5 that tell you to check the disk with Disk First Aid and update the disk's driver with Apple HD SC Setup (or HD IDE Setup if you have a PowerBook 150) before you do the installation. Otherwise, you're asking for trouble: crashes, disk-access difficulty, and other problems you don't need.

Sharon Zardetto Aker's new book, The Mac Almanac, *has a chapter on PowerBooks. A teacher at Montclair State University, Rich Wolfson insists that he does* not *perform PowerBook repairs naked in the bathroom.*

You can find WindowShade, SuperClock, and FindPro III in the MacUser and ZiffNet/Mac areas on CompuServe and eWorld. See page 4 for instructions on accessing ZiffNet/Mac.



NET TRAVELER / BY MICHAEL SWAINE

An Internet Hot List

Five must-see Mac sites on the Internet, why you may not need an Internet book, and how to read Mosaic addresses.

ARE YOU READY FOR the Internet? Both Microsoft and Apple plan to make Internet access a standard feature of their operating systems in the next 12 months. Make no mistake — you're probably going to end up using the Net. The real question is, What will you do once you get there?This column is a traveler's guide to site-seeing on the Net. This month, I'll start out by listing the five Internet Mac sites I believe every Mac traveler should visit. Think I missed one? We'll talk later.

1. Ever noticed how the most widely recommended travel locations always turn out to be overbooked and overcrowded? For anyone looking for Macintosh shareware and freeware, **the Info-Mac archive** is probably the best source on the Net. Unfortunately, everyone thinks so. Fortunately, the Info-Mac archive is available at 50 mirror (alternative) sites worldwide. Get the list of sites from gopher://sumex-aim.stanford.edu/info-mac/help/mirror-list.txt.

2. With more than 9,000 in existence, there's no such thing as **the best newsgroup;** if you're looking to see if someone is selling a used Quadra 950, the best group for you might be on your local (business, school, or community) server. Or maybe you don't think any Usenet group can measure up to ZiffNet/Mac, because your favorite guru hangs out there. The point is, newsgroups are only as good as their participants. The Usenet comp.sys.mac.* hierarchy, open to the entire Usenet-using universe, may not make your best-of-the-Net list, but it is a definite must-see.

3. Back issues of Adam Engst's informative **TidBITS newsletter** can be located at ftp://ftp.tidbits.com/pub/tidbits/ (as well as on the World Wide Web at http://www.dartmouth.edu/pages/TidBITS/TidBITS.html), along with a fine collection of Internet wares of the free and share varieties.

4. Mosaic was created at the National Center for Supercomputing Applications (NCSA), at the University of Illinois at Urbana-Champaign (UIUC), and all things Mac-ishly Mosaical (except for Mosaic's commercial progeny) reside at http://www.ncsa.uiuc.edu/SDG/Software/MacMosaic/MacMosaicHome.html.

5. You might call the Info-Mac Archive's bounty of third-party freeware and shareware a windfall, but keep in mind that you can also shake the **Apple** tree itself at ftp://ftp.apple.com/dts/mac/ (as well as on the Web at http://www.apple.com/). Again, you'll want to look for mirror sites.

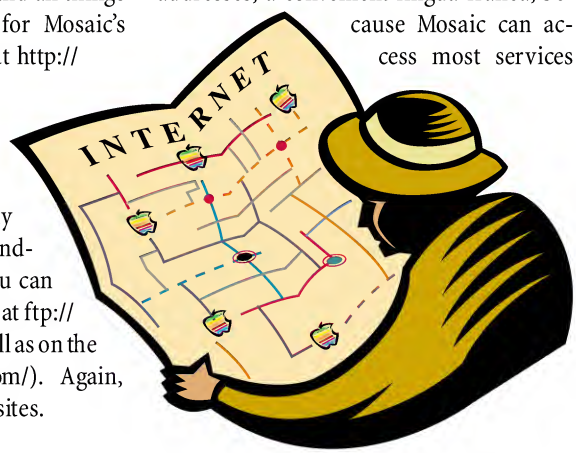
Internet Unplugged

An avalanche of Internet-related books is now crashing onto bookstore shelves everywhere. Why so many? The answer is greed, not need. To book publishers, the Internet is the biggest thing since DOS, and they all want a piece of the action. The first wave of books explained how to get on the Net, something your service provider should be able to walk you through. The second wave tells where to go once you get on, information that is fresher and cheaper on the Net itself. Another consideration is that only approximately half a dozen of these books are Mac-specific. Conclusion: Think twice before buying an Internet book.

For those who feel they must buy one, the advice in Adam Engst's *Internet Starter Kit for Macintosh* (Indianapolis: Hayden Books, 1993) is excellent, and the book comes with the software you need in order to make use of a private Internet account.

Tip of the Month

Future tips will tell how to get the most out of the Internet, but in the first installment of this column, I thought a tip on reading URLs would be helpful. URLs are Mosaic-style addresses, a convenient lingua franca, because Mosaic can access most services on the net, including FTP, Gopher, and WAIS. For those who don't have Mosaic, a URL such as gopher://stateu.edu/software/mac or ftp://stateu.edu/software/mac just means to use Gopher or FTP to get to the stateu.edu server and then follow the hierarchy to software/mac.



Don't Know a URL from a UFO?

MacUser maintains a list of frequently asked questions (FAQs) about the Internet, *MacUser* itself, and this column specifically at faq@macuser.ziff.com. You can reach me at traveler@macuser.ziff.com.

ILLUSTRATION / LIN WILSON



BY ANDY IHNATKO AND BOB LEVITUS / *Tips compiled by Christopher Breen*

Help Folder

Results of our stereogram contest, how to equip your Mac for System 7.5, and what happens when you rebuild the desktop.

3-D Deluge

ANDY: I thought there were five or six dozen people reading this column — a hundred, tops. I stand corrected: there are at least 819 regular readers of Help Folder, because as of this writing, that's how many people have entered our October '94 stereogram contest (page 145). Helen Hunt, if you've been trying to get in touch with me via CompuServe, don't blame me — blame all the folks who mailed me, seeking a free T-shirt.

The hidden message was MST3K, the acronym for the popular cable-TV show *Mystery Science Theater 3000*. Hundreds of you identified the message correctly, but there can be only two winners. Charles Stines, of Modesto, California, and Jason Miller, of Eden, New York, got their responses to me the quickest and should already be wearing their new T-shirts to swanky affairs on either coast.

The most popular question asked was, "What does this have to do with universal peace and brotherhood?" — referring to the clue I gave. Well, I guess if you stay home watching a cool TV show every night, you can't be out hitting people on the head or something.

Thanks to all the readers who pointed out a less expensive product than Kai's Power Tools 2.0 for creating stereograms — Pointillist ($39.95), from Pictor GraFX (310-865-0495).

Write to Help Folder/Tips

c/o *MacUser*
950 Tower Lane
18th Floor
Foster City, CA 94404

Don't want to wait for an answer? Post your question on ZiffNet/Mac, MacUser's on-line service, and get a reply from Bob (76004,2076) or Andy (72511,204). We pay $25 – $100 for any undocumented tips we publish. Send them to Christopher Breen (72241,1036).

ILLUSTRATION / JAMES O'BRIEN

*. . . BUT WERE AFRAID TO ASK

This is the place where we're delighted to answer questions that readers deem too simple, too hackneyed, or even too dang weird to want to have their identity revealed. So by all means, query us. If you're feeling sheepish, we'll gladly cover your tracks by substituting an assumed name. We'll say your question was submitted by someone who, in his own small way, helped Arnold Schwarzenegger avert Earth's nucleoapocalyptic destruction in *Terminator 2*.

SYSTEM 6.0.5 HOLDOUT



Q. How much longer do you think I can hold out with System 6.0.5 before upgrading to System 7?

Bud Brigman
Benthic Petroleum

ANDY: You can hold out indefinitely, as long as you have supplies of oxygen, food, and water; stable and reliable AC power; and most important, body armor to protect you from the abuse and derision of the remaining 99.44 percent of the Mac community, which switched to System 7 years ago. I recommend the Special Operations Jacket, from Second Chance Body Armor (800-253-7090). Its Kevlar panels afford NIJ-approved II, IIA, and IIIA ballistic coverage.

If you plan to buy more software before you die, the day will certainly come when you'll have to upgrade. But while you're holding out, be sure to back up the software you're running under System 6 — it can be painfully hard to replace versions that are no longer shipping.

How Much RAM for System 7.5?

Q. How will upgrading to System 7.5 affect my Mac's performance if I have only 4 MB of RAM installed?

Haseeb Omar
Cupertino, CA

BOB: You can successfully run System 7.5 with 4 MB of RAM, according to Apple, but I wouldn't do it. Although System 7.5 itself uses less than 3 MB of RAM (without PowerTalk or QuickDraw GX, of course), that doesn't leave much RAM for programs on a 4-MB machine. Toss in a few of those essential control panels or extensions — Now Utilities, QuicKeys, After Dark — that each gobble up a chunk of RAM, and before you know it, there's no RAM left for your programs. I recommend at least 5 MB; 8 or more is much better.

For those who can't afford the RAM chips, the RAM Doubler software package from Connectix (800-950-5880 or 415-571-5100) is almost as good. For about $50 (street), it can make your 4-MB Mac believe it has 8 MB. It's not quite as good as real RAM, but it's an inexpensive next-best thing.

ANDY: I'd go further to say RAM Doubler is better than the next-best thing — if you're typically running lots of modest applications as opposed to a few memory-hungry programs, you won't notice the difference.

Why Rebuild the Desktop?

Q. I know it's good practice to rebuild the desktop periodically, but I don't know why. Does it free up memory? Can I use Norton

Utilities or Apple's ResEdit to figure out when it's time to rebuild the desktop?

Also, is it better to rebuild the desktop just before performing a Norton backup or just after a Norton restore?

Stan Heaps
Boutiliers Point, NS, Canada

BOB: The rationale for rebuilding the desktop is to purge unneeded information from the hard disk. The Finder relies on invisible desktop databases to keep track of applications, icons, documents, and aliases and the relationships among them. Like most databases, these desktop databases don't get rid of data they don't need, such as information about deleted items. This clutter takes up hard-disk space unnecessarily and may slow down the Finder. I recommend rebuilding the desktop (by holding down Command-Option during the entire startup process) every month or two. And I'd do it after a restore rather than before a backup so the databases contain the most-current information.

ANDY: There are ways to use ResEdit and a cast of other programs to determine when you should rebuild the desktop, but the process is so complicated that it's hardly worth it. It's better to forget about keeping track of the desktop databases and think of rebuilding in the same way I think of repairing my car. When my car won't start, I just get out and kick the dented fender as hard as I can over and over again. It makes me feel a whole lot better, and through some process I don't fully understand, the car often starts right up on the next try. Similarly, when your Mac's acting up — for instance, when document icons turn generic or an application won't launch — try rebuilding the Desktop. Since so many of the Mac's operations rely on an accurate desktop file, sometimes that fixes the problem.

PowerPC Envy

Q. I've read with envy about upgrade paths to the PowerPC processor. Unfortunately, all the upgrade boards marketed so far are for 68040-based Macs, such as the Quadra, leaving IIsi owners such as me out in the cold. Is the incompatibility between the two designs too great for an adapter card to bridge?

Rick Steffens
Girard, KS

ANDY: Naw, there is no incompatibility so savage that a big pile of hardware can't bridge the gap. If only the nations of the world could follow the example of the humble microcomputer, especially now, a time when human life is so cheap, and.... Sorry, I always get that way right after I listen to a Sting album.

Anyway, the reason Apple's PowerPC upgrade card is only for 68040 machines is that those machines are just so jolly friendly, hardwarewise (the hardware architecture of the 68040 machines is closer than that of the 68030 machines to the architecture of Power Macs), that a pretty simple microprocessor arrangement and a PDS card are all you need. Also, Apple's not terribly keen on developing PowerPC solutions for the myriad of 68030 products it made years ago.

Why bother when you've got DayStar Digital ready, willing, and able to step into the breach? Last year it signed an exclusive agreement with Apple to develop a PowerPC card for the Mac IIsi, IIci, IIvi, and Performa 600. At this writing, DayStar (800-962-2077 or 404-967-2077) says the PowerCard 601 ($599) will be available sometime during the first quarter of 1995.

BOB: Unfortunately, there is no PowerPC upgrade path, nor does it look like there will ever be, for us unfortunate II, IIx, IIcx, and IIfx owners. If you're one of us, you'll have to buy new to get PowerPC performance.

Thesaurus Recs

Q. Which thesaurus do you recommend for the Mac?

Daryl R. Herzog
Nipomo, CA

BOB: I've tried a bunch of them and have settled on The Deluxe American Heritage Dictionary ($129), a combo dictionary and thesaurus from SoftKey International (800-227-5609 or 617-494-1200). It has 200,000



figure 1 / **If you need a thesaurus** or a dictionary, either The Deluxe American Heritage Dictionary or Thunder7 should suit you. Choosing between them depends on your needs — American Heritage has a comprehensive list of words; Thunder7 works with almost any program.

TIPS / PowerBook

DEACTIVATING DUO BUTTONS

Working with my PowerBook Duo while sitting on the couch used to be difficult. It's easy to unintentionally press the trackball's bottom button with your stomach, no matter what your body type. To fix this, I use the freeware extension PowerClick (available on-line; see end of article). It lets you assign Click Lock, Double Click, Single Click, or Nothing to each of the two Duo buttons. I assigned Nothing to the bottom button so it doesn't matter if I accidentally press it.



Joseph O. Holmes
New York, NY

VALUE-PACKED BOOT DISK

A bootable System 7 floppy disk usually has little space left for other software you might want at boot time, such as disk-optimizer utilities and network-access software. Here's a trick to free up an additional 60K. AutoDoubler comes bundled with a utility called AutoDoubler Internal Compressor (AIC), which compresses the resources inside an application and inserts a decompression engine into the finished compressed file so it can run without AutoDoubler. AIC can compress the Finder by about 60K — *if* you can get the Finder to appear in AIC's window as a compressible file. To do this, make a copy of the Finder and use DiskTop or a similar utility to change its type and creator from FNDR and MACS to something like APPL and ttxt. Then, use AIC to compress it, and change the type and creator back to FNDR and MACS. (This trick won't help you compress the System file or system enablers, however.)

David Atkinson
Seattle, WA

TIPS / Graphics

SPEEDIER PRINTING IN FREEHAND

You can speed up printing of FreeHand 4.0 documents that include placed EPS files by converting the files to FreeHand art. That's the easy part. The trick is to make FreeHand do the conversion automatically whenever you place an EPS file.

To set the conversion up, open the FreeHand Preferences file, in the Aldus folder in your System Folder. Change the line `(CrackPlacedEPS) (No)` to `(CrackPlacedEPS) (Yes)`. Now whenever you place an EPS file in your document, the file automatically converts to FreeHand art.

Joe Block
Miami, FL

PHOTOSHOP 3-D EFFECT

I've found a way to use Photoshop to approximate the 3-D effect you can see through those red-and-blue 3-D glasses. Just follow the steps listed here:

Open a 24-bit-color image — nonabstract images such as landscapes and portraits work best. Press Command-1 to edit the red channel, and then select the entire image by pressing Command-A. Go to Other, on the Filter menu, and select Offset. In the dialog box that comes up, enter negative values into the offset boxes to offset the selection a few pixels (use values between –2 and –5) up and to the left. Now press Command-3 to edit the blue channel, and offset this channel by the opposite, positive values — causing the channel to move down and to the right.

Press Command-0, and — presto — your Photoshop image appears in quasi-3-D when viewed through the proper eyewear.

Roy Rodenstei
via America Online



Although blurry to the naked eye, this image created in Photoshop comes into focus in 3-D when you wear 3-D glasses.

words and 500,000 synonyms, and although it uses only 14 MB of hard-disk space, it's the most complete, easiest-to-use, and most convenient dictionary/thesaurus I've tried (see figure 1).

ANDY: I heartily second the recommendation of the American Heritage Dictionary, but I also suggest Thunder7 ($99), from Baseline Publishing (800-454-9333 or 901-527-2501). Although its list of words isn't terribly exhaustive, it can work with just about any program. This control panel can add on-the-fly spell checking as well as thesaurus and dictionary features to such programs as databases and communications packages.

BOB: There's always Microsoft Bookshelf, which includes all kinds of cool modules, such as a thesaurus, the American Heritage Dictionary, an encyclopedia, an atlas, and an almanac. But it has some serious drawbacks — it requires a CD-ROM drive, and because it's on CD-ROM instead of your hard disk, it's horrifyingly slow. The biggest drawback for me is I can't quickly switch to Myst, because the Bookshelf CD-ROM is occupying the drive.

Protecting Your Mac

Q. I see ads and reviews everywhere for disk-repair utilities, but do I really need one? I have had my Mac for only a year, back up regularly, have never had problems, and have my computer only for personal use.

Also, my dealer is offering me an extended warranty on my Mac for $350. Is it worth it, and do you happen to know the trouble-free life expectancy of a Mac LC?

Richard Plourde
Edmundston, NB, Canada

BOB: Whether you really need a utility package such as Symantec's Norton Utilities or MacTools depends on if you prefer (A) lugging your broken Mac down to the repair shop and paying a technician $100 to fix it and possibly losing all the data on your hard disk or (B) fixing it yourself with $100 worth of software without losing the contents of your hard disk.

Even with good backups, which would make the whole thing a little less painful, I still go for answer B every time. Disk-diagnosis and -repair utilities are cheap insurance against common problems. For instance, directory damage occurs all too often — damage so severe that the only recourse is to erase the hard disk and reinitialize. Norton Utilities or MacTools can monitor your hard disk, automatically diagnose directory damage, and repair it before you lose data.

ANDY: Agreed. Just as you ought to know where your fire extinguisher and first-aid kit are in your house, every Mac user should have quick access to a hard-drive-formatting utility, such as Casa Blanca Works' Drive7 or FWB's Hard Disk ToolKit; a data-recovery package; and a virgin set of system-software installation disks.

As for hardware-diagnosis programs, although they're useful for measuring overall system performance and checking on your current configuration, on the whole, they're just a high-tech way of determining the reason your keyboard doesn't work is that it's broken.

BOB: To answer your second question, the trouble-free life expectancy of any Mac is directly related to when you decide to sell it — your Mac will die right before you place the ad. Even though a warranty would come in handy in that situation, I think AppleCare and other extended warranty plans are a rip-off. My out-of-pocket expenses for repairs for the Macs I've owned, even for the Mac Plus that went through three power supplies in four years, have been much, much lower than the cost of AppleCare.

You can find the programs referenced in this article in the MacUser and ZiffNet/Mac areas on CompuServe and eWorld. See page 4 for instructions on accessing ZiffNet/Mac.

TIPS / Clarifications

MODEM SILENCING

The tip in the October '94 "TIPS / Telecom" sidebar (page 139) had a confusing instruction for silencing your modem. For this tip to work, you should add the letter `M` and the number `0` (zero) to the end of the line of code specified in the tip.

FORCE QUIT

A few readers wrote in with warnings against using the Force Quit command, recommended in the "TIPS / System Software" sidebar in October '94 (page 145). Bear in mind that Force Quit is likely to make your Mac unstable and should probably be used only to save changes to files when your Mac crashes. Other uses are risky.

Templates of Doom

I DON'T UNDERSTAND why everyone is preoccupied with Apple's fate as a buyout candidate.

But they are. Apple fans should hope that Apple itself goes on a buying binge just to make itself a little more indigestible. We all know that if Apple is taken over by, merged with, or simply bought out by a large industrial-strength corporation, it'll soon be just another footnote in computing history.

The players most often mentioned in takeover scenarios are IBM, Sony, AT&T, and Motorola. Here are the chronologies, as I see them for Apple, if any of the gang of four managed to buy Apple.

IBM

Initial Action. Makes public statement to the effect that the company has good management and users can expect no changes at Apple that will affect them or the platform.
First Six Months. In a reorganization, drops Apple name in favor of IBM Cupertino.
Second Six Months. Announces Macintosh/Personal PowerPC/RS 6000 strategy for upward-mobility path.
First Year. IBM makes one-year-anniversary announcement at Super Bowl mocking famous "1984" commercial by having the hammer-wielding woman from the commercial beat the crap out of various Apple executives in a pointless mock boxing match. IBM wastes $500,000,000 on the sponsorship.



Second Year. Merges Macintosh into PowerPC line. Drops Macintosh name and labels both systems Power Computer.
Third Year. Closes down IBM Cupertino, unable to explain why it bought Apple in the first place. Stock goes up.

Sony

Initial Action. Makes public statement to the effect that the company has good management and users can expect no changes at Apple that will affect them or the platform.
First Six Months. Announces new laptops, which all experience software anomalies that it promises to fix.
Second Six Months. Moves production of all Macs to Asia and Mexico. Says it will relocate Corporate HQ to Osaka.
First Year. Not one single new product but lots of celebrity endorsements for current products. Billy Joel and Barbra Streisand, both claiming to be computer users, figure prominently. Scandal ensues when, during a demo, Streisand is captured on tape jumping onto a desk screeching, "Mouse! *Where?*"
Second Year. Drops Apple name and calls the machine the Sony Macintosh. Decides to use x86 architecture to make computer more compatible with IBM PC.
Third Year. Discontinues Mac OS and forms strategic alliance with Microsoft. Renames computer Mac PC. Reviewers call it a "lesser clone." Sales plummet.

AT&T

Initial Action. Makes public statement to the effect that the company has good management and users can expect no changes at Apple that will affect them or the platform.
First Six Months. Remodels the cases for all the Macs and paints them all flat black.
Second Six Months. Moves entire company to northeastern New Jersey.
First Year. Announces plans to turn Mac into set-top box and outlines elaborate but idiotic scheme to capitalize on media convergence and the interactive-TV revolution. Two dozen other companies follow this lead and make a similar announcement.
Second Year. Wants to change name from Macintosh to simply MAC. New York ad agency gets involved, and somehow the name gets changed to Mac! with an exclamation mark. Suddenly decides Mac Davis would be a good spokesman.
Third Year. Falling sales prove intolerable, and the entire division is folded. Executives say the computer was ahead of its time.



Motorola

Initial Action. Makes public statement to the effect that the company has good management and users can expect no changes at Apple that will affect them or the platform.
First Six Months. Raises Macintosh prices 30 percent.
Second Six Months. Raises Macintosh prices another 30 percent.
First Year. Sees error of price increases and drops Macintosh prices 50 percent.
Second Year. Hires new VP from a lobster company who devises new daily-fluctuation pricing scheme. "They price lobsters that way, and it works!" Sales fall.
Third Year. After executives complain that the market is too volatile, sells Apple to Compaq, which closes it down after six months.

As you can see, the best company to buy Apple would be RJR Nabisco.

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